FINAL

INSTALLATION RESTORATION PROGRAM

SITE INSPECTION REPORT VOLUME II OF III

102nd AIR CONTROL SQUADRON NORTH SMITHFIELD AIR NATIONAL GUARD STATION SLATERSVILLE, RHODE ISLAND

SEPTEMBER 1995

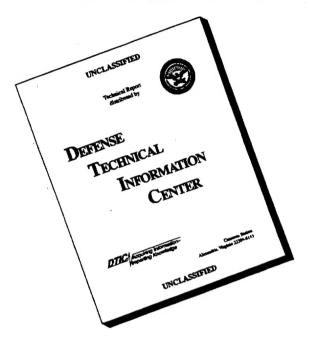


Prepared For AIR NATIONAL GUARD READINESS CENTER ANDREWS AFB, MARYLAND 20331-6008

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FINAL

INSTALLATION RESTORATION PROGRAM

SITE INSPECTION REPORT

102nd AIR CONTROL SQUADRON NORTH SMITHFIELD AIR NATIONAL GUARD STATION SLATERSVILLE, RHODE ISLAND

SEPTEMBER 1995

Prepared For

AIR NATIONAL GUARD READINESS CENTER ANDREWS AFB, MARYLAND 20331-6008

Prepared By

ANEPTEK CORPORATION

* 209 West Central Street Natick, Massachusetts 01760

APPENDIX A

PASSIVE SOIL GAS SURVEY REPORT





November 28, 1994

Mr. Mike Plumb ANEPTEK Corporation 209 West Central Street Natick, Massachusetts 01760

Phone: (508) 650-1048 Fax : (508) 651-1560

Dear Mr. Plumb:

Enclosed please find the draft report on the findings of the PETREX Soil Gas investigation performed at the North Smithfield ANGS Site located in Slatersville, Rhode Island.

If you have any questions concerning the enclosed, please do not hesitate to call either Mark Hatheway or myself. We will await your comments prior to issuing our final report.

Respectfully Submitted, NORTHEAST RESEARCH INSTITUTE LLC

Julia Olney Gullett Senior Geologist

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FINAL REPORT ON THE FINDINGS OF THE PETREX SOIL GAS SURVEY CONDUCTED FOR ANEPTEK CORPORATION

PREPARED BY:	DATE:
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1.0 EXECUTIVE SUMMARY

Northeast Research Institute LLC (NERI) and ANEPTEK Corporation recently performed PETREX Soil Gas sampling at the Air National Guard Station (ANGS) in North Smithfield, Rhode Island. The purpose of the soil gas investigation was to screen the study area for the presence of benzene, toluene, ethylbenzene/xylene(s) (BTEX), trichloroethene (TCE), and trichloroethane (TCA) which may be indicative of chemical occurrences in the subsurface.

VOCs related to petroleum hydrocarbon mixtures such as gasoline, and Diesel/Fuel Oil fuel were identified in soil gas. Limited occurrences of the chlorinated solvents TCE and tetrachloroethene (PCE) were also detected. TCA was not identified in soil gas. The distributions of the gasoline and Diesel/Fuel Oil fuel mixtures were mapped by characterizing the hydrocarbon compounds detected and formulating soil gas signatures, or fingerprints, for each mixture. High soil gas response levels of hydrocarbons more likely related to gasoline (such as BTEX), were detected east of Building 110, north of Building 106 and in the vicinity of Buildings 107 and 111. The soil gas response levels detected in each of these areas may be indicative of potential source areas of gasoline release. High relative response levels for the Diesel/Fuel Oil like hydrocarbons (such as naphthalene) were detected in the vicinity of Building 109 and northwest of Building 106. The intermediate response levels for both mixtures indicate that primary migration of the hydrocarbons may have occurred following a north - south migration pathway. The hydrocarbon occurrences appear to extend beyond the survey boundaries primarily to the north, therefore the areal extent of the VOC occurrences was not defined by this investigation.

2.0 INTRODUCTION

Northeast Research Institute LLC (NERI) and ANEPTEK Corporation recently performed PETREX Soil Gas sampling at the Air National Guard Station (ANGS) in North Smithfield, Rhode Island. The purpose of the soil gas investigation was to screen the study area for the presence of benzene, toluene, ethylbenzene/xylene(s) (BTEX), trichloroethene (TCE), and trichloroethane (TCA) which may be indicative of chemical occurrences in the subsurface.

3.0 OVERVIEW OF THE PETREX TECHNIQUE

Each PETREX soil gas sampler consists of two or three activated charcoal adsorption elements (collectors) housed in a resealable glass container in an inert atmosphere.

Soil gas sample collection is performed by unsealing the sampler and exposing the collector to the soil gas of the subsurface environment at the base of a shallow borehole. Sample collection proceeds via free vapor diffusion through the opening of the uncapped sampler container. Following a controlled period of time, the sampler is retrieved from the borehole, resealed, and submitted for analysis.

One collector from each soil gas sampler is analyzed by Thermal Desorption/Mass Spectrometry (TD-MS). Selected second collectors may be analyzed by Thermal Desorption-Gas Chromatography/Mass Spectrometry (TD-GC/MS) for compound confirmation. At least ten percent of samplers used in any project are three collector samplers. The third collector is used for setting instrument sensitivity prior to analysis.

Compounds are identified by comparison to standard reference spectra run on the same instrument. The mass spectral ion count of the appropriate indicator peak(s) for each compound or group of compounds is then plotted as relative response on a map and contoured using a variety of standard geostatistical analyses.

For a more detailed and technical discussion of the method, please refer to Appendix A, PETREX Protocol.

4.0 OBJECTIVES

The purpose of the PETREX Soil Gas Survey was to:

- 1. Collect and report VOC's and SVOC's as constituents of soil gas;
- 2. Map the areal extent of the reported compounds in order to exhibit areas of potential subsurface contamination; and
- 3. Attempt to determine the extent of migration of the reported compounds in the subsurface.

5.0 SCOPE OF WORK

Eighty (80) PETREX soil gas samplers were utilized for this soil gas investigation. Samplers were place in a regular pattern throughout the site on one hundred (100) foot intervals. The survey was designed by ANEPTEK to screen potential source areas including the septic leach field located south of the primary study area.

6.9 FIELD ACTIVITIES

Sampler installation was performed between October 13th and 17th, 1994, sampler retrieval was performed on November 2nd and 3rd, 1994. Sampler installation and retrieval was performed by ANEPTEK personnel following one day of on-site training in the methods and protocols associated with performing a PETREX Soil Gas Survey.

Sampler exposure time was determined by the use of exposure time test samplers (time tests). Time test samplers were installed concurrently with the survey sampler installation and removed for analysis following a three (3) day exposure period. The purpose of the time test samplers was to assess the loading rate of Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs) onto the PETREX collectors. Based upon the analyses of time test samplers, 16 days was determined to be an optimum exposure period.

7.0 METHOD QA/QC

7.1 Lot Control

Quality assurance/quality control (QA/QC) collectors from each lot manufactured by NERI were analyzed by TD-MS to ensure that they were contaminant free before the lot of collectors used in the field was released from the PETREX laboratory. No compounds were detected above background on the QA/QC collectors.

7.2 Travel Blanks

Two PETREX samplers were provided as travel blanks. These travel blanks remained sealed and traveled with the survey samplers from the laboratory to the field and back to the laboratory to monitor for potential contamination of the survey samplers. The travel blanks were analyzed under the same instrument conditions as the survey collectors. The results of the analysis of the travel blanks are provided in Table 1, Appendix B.

A more detailed description of the PETREX QA/QC may be found in the PETREX Protocol located in Appendix A.

8.0 RESULTS

All samplers were analyzed by NERI's standard method of Thermal Desorption/Mass Spectrometry (TD-MS). The results of the analyses indicate that petroleum hydrocarbon mixtures related to both a gasoline and Diesel/Fuel Oil mixture were the most prominent compounds detected in soil gas. The distributions of the gasoline and Diesel/Fuel Oil fuel mixtures were mapped by characterizing the hydrocarbon compounds detected and formulating soil gas signatures, or fingerprints, for each mixture. In order to report the compounds identified, mass spectral peaks indicative of the compound mixtures were selected and their corresponding ion counts were summed. Table 2 lists the mass peaks (indicator peaks) which were used to represent the petroleum hydrocarbon mixtures reported in Table 1, Appendix B, and Plates 2-3, Appendix D.

TABLE 2 REPORTED COMPOUNDS AND THEIR INDICATOR MASS PEAKS (AMU)

Compound

Indicator peak

Gasoline Mixture

C₆-C₁₀ Aromatic Hydrocarbons

78, 92, 106, 120, 134

Diesel/Fuel Oil Mixture

C9-C₁₄ Aliphatic Hydrocarbons

123, 137, 151, 165, 181, 195

In addition to the compounds reported above, limited occurrences of TCE and PCE were also identified. The locations and relative response of these occurrences are reported in Table 3, Appendix B.

Example mass spectra of the mixtures identified in this soil gas investigation are provided as Figures 1-4, Appendix C. A mass spectrum of a representative travel blank is shown in Figure 5.

9.0 DISCUSSION

The soil gas response levels discussed in the following section are described as high and intermediate relative to the entire data set. The ion count values that have been reported represent qualitative soil gas values that were evaluated relative to the other sampler locations.

The response values are reported in ion counts. Ion count values are the unit of measure assigned by the mass spectrometer to the relative intensities associated with each of the reported compounds. These intensity levels or response levels do not represent an actual concentration of the reported compounds; however, they are best utilized as a qualitative measurement. A difference in fon count values of an order of magnitude or more is considered

significant when interpreting potential source areas and migration/dispersion pathways versus background areas.

The contour intervals depicted on Plates 2-3 were determined using histograms formulated from the statistical distribution of the data set. The histograms used to determine the sample population breaks are provided as Figures 1-2, Appendix D.

For a complete discussion of relative response map evaluation, please refer to the PETREX Protocol, Appendix A.

9.1 The Distribution of The Gasoline Mixture

The distribution of the Gasoline Mixture is shown on Plate 2, Appendix E. High soil gas response levels of the gasoline range hydrocarbons were detected in the vicinity of Building 110, north of Building 106 and in the vicinity of Buildings 107 and 111. The soil gas response levels detected in each of these areas may be indicative of potential source areas of gasoline release. Several spatially continuous samples exhibiting high response levels were detected east of Building 110 in a north - south trending pattern. The responses detected in this area may indicate a primary potential source in this area. Intermediate response levels, which generally depict migration patterns, for the gasoline mixture were detected throughout the central portion of the study area, and also appear to follow a north-south migration pathway. The intermediate response levels detected in the vicinity of Building 106 indicate that migration is limited to this vicinity. The intermediate response levels detected in the vicinity of Building 111 indicate that migration may have occurred towards the northeast. Isolated occurrences of intermediate response were also identified in the vicinity of Buildings 104 and 105, west of Building 108 and at a single location in the leach field. The environmental significance of these apparently separate occurrences is difficult to ascertain, however the response levels detected at these locations are not those generally indicative of potential source areas. The distribution of the gasoline mixture extends beyond the survey boundaries to the north, east and potentially to the west and was not defined.

The identification of the aromatic hydrocarbons was not possible at several sample locations due to interference associated with terpenes. Terpenes are naturally existing vegetative compounds sourced predominantly from pine trees, whose mass fall within the same mass range as several petroleum hydrocarbons. The samples in which interference by terpenes masked the identification of the gasoline range hydrocarbons have been denoted by a "T" on Tables 1, Appendix B, and Plate 2, Appendix E.

9.2 The Distribution of The Diesel/Fuel Oil Mixture

High relative response levels for the Diesel/Fuel Oil hydrocarbons were detected in the vicinity of Building 109, northwest of Building 106 and at a single location southeast of Building 110. The intermediate response levels detected indicate a north-south preferential migration pathway.

Isolated occurrences of the diesel/fuel oil mixture were also detected east and southeast of Building 104, and east of Building 111.

10.0 CONCLUSIONS

VOCs related to gasoline and diesel/fuel oil petroleum hydrocarbon mixtures were detected in soil gas at this site. In addition limited occurrences of TCE and PCE were detected. The distributions of the hydrocarbon mixtures were mapped and potential source areas were identified. The primary potential source area of gasoline release appears to have been identified in the vicinity located east of Building 110. The primary potential source area of diesel/fuel oil release appears to have been identified in the are located west of Building 109. A preferential migration pattern trending north-south appears to exist for both compound mixtures. The areal extent of hydrocarbon occurrences extends beyond the survey boundaries, and was not defined by this investigation.

The distribution of the compounds which comprise the diesel/fuel oil soil gas mixture is less extensive than that of the aromatic compounds which define the gasoline mixture. The aliphatic compounds are much less mobile in the subsurface due to their chemical structure and lower mobility. Conversely the higher solubility and mobility of the aromatic compounds tend to illustrate the extents of chemical migration.

Because soil gas emanation rates are site and chemical specific, the environmental significance of the soil gas response values must be determined relative to compound concentrations in subsurface soil and/or groundwater. Changes in soil gas response in orders of magnitude may be used to plan future investigative studies, and to aid in characterizing the behavior (migration, attenuation) of the chemicals in the subsurface. The PETREX method is extremely sensitive and often detects compounds in the low part per billion (ppb) range; therefore areas depicted as background by the PETREX method generally do not represent environmentally significant contaminant levels in the subsurface.

11.0 RECOMMENDATIONS

Based upon the findings of the PETREX soil gas survey, NERI recommends:

- 1. Performing an extended PETREX soil gas survey in directions in which chemical occurrences appear to extend beyond the limits of this investigation. The data obtained from this follow up investigation can be used to determine additional potential source areas and define the areal extent of migration.
- 2. Perform subsurface profiling in the vicinity of sample locations 21, 24, 25, 30, 33, 36, 41, 45, 48, 53, 60 and 62. Soil and groundwater analyses should include methods which detect aromatic and aliphatic hydrocarbons as well as chlorinated hydrocarbons.

12.0 LIMITATIONS

This report represents NERI's professional interpretation and judgment based on technical information gathered during investigative activities. Professional judgments expressed herein are restricted to facts available within the established limits of the scope of work, budget, and schedule. NERI assumes no responsibility for the existence or disclosure of conditions which did not come to its knowledge, or conditions not generally recognized as environmentally unacceptable, at the time this report was prepared.

It is NERI's specific intent that all observations and conclusions presented will be used as a guide and not necessarily a firm course of action unless explicitly stated as such. No warranties are expressed or implied and the information included in this report is not to be construed as legal advice.

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APPENDIX A
PETREX Protocol

PETREX ENVIRONMENTAL SOIL GAS PROTOCOL

INTRODUCTION

The PETREX Technique provides a means by which trace quantities of gases from subsurface derived organic contaminants can be detected and collected at the earth's surface. The Technique is integrative, thereby eliminating the short-term variations associated with other gas/vapor detection methods. The PETREX Technique directly collects and records a broad range of organic compounds emanating from subsurface sources.

SOIL GAS COLLECTOR PREPARATION

Adsorption collector wires (after construction) are cleaned by heating to 358° C in a high vacuum system. Wires are packed under an inert atmosphere in glass culture tubes. One collector out of every batch of thirty is checked for cleanliness by mass spectrometry. Another collector from the batch is checked for adsorptive capability. Based on the results, the batch of collectors is approved for release into the field.

SOIL GAS SAMPLER INSTALLATION

The sampler consists of two or three collectors, each a ferromagnetic wire coated with an activated charcoal adsorbent in a screw top glass culture tube. Each sampler is typically placed in a shallow hole, 14-18 inches deep. The hole is backfilled and the location is marked. The sampler is left in the ground from one to thirty days, then retrieved and sealed for transportation back to the laboratory for analysis.

The PETREX soil gas sampling technique is adaptable to various surface conditions commonly encountered within survey areas. These surfaces typically include concrete, asphalt, grass, and gravel. Two installation methods are routinely utilized to adapt to these surface conditions.

The first method utilizes a coring shovel for sampler installations in grass or otherwise loosely consolidated soil conditions. The shovel cores a 14 inch deep by 2 inch diameter hole in the surface soils.

PETREX soil gas samplers are placed (open end down) at the bottom of each core hole. The samplers are then backfilled with an aluminum foil plug and the original excavated soil. To complete installation, sample locations are marked with ribbon flagging and a numbered pin flag, as well as entered into a field notebook and plotted on a field map.

The second method of sampler installation utilizes an electric rotary hammer, equipped with an 18 inch by 1.5 inch diameter drill bit, for sampler installations under concrete, asphalt, or otherwise consolidated conditions. A hole is drilled through the surface to the dimensions of the drill bit equipped to the rotary hammer.

PETREX soil gas samplers are placed at the bottom of each drilled hole. For retrieval purposes, a cleaned galvanized steel wire is attached to each sampler. Aluminum foil is used to plug each hole to approximately two inches below grade. Then each hole is capped to grade with hydraulic cement. The hydraulic cement serves as protection from the external surface environment.

To complete sampler installation, sampler locations are marked with paint (where applicable), entered into a field notebook, and plotted on a field map.

SOIL GAS SAMPLER RETRIEVAL

PETREX soil gas samplers are retrieved following a time period that has allowed for the soil gas emanating from the subsurface environment of a survey area to equilibrate with the installed PETREX samplers. This time integration period is determined for each PETREX soil gas survey based on time calibration data or site conditions.

Retrieval operations are dependent on surface conditions and routinely consist of the following two methods.

The first method applies to grass covered or loosely consolidated soil conditions. A trowel is utilized to expose the backfilled samplers; then with a pair of tongs, the samplers are brought to the surface. At the surface, the samplers are sealed, cleaned, and labeled. Following retrieval, all debris are gathered and the core hole is backfilled with original material.

The second method applies to concrete, asphalt, or other consolidated surface conditions. A hammer and chisel is utilized to remove the hydraulic cement plug and expose the sampler. By means of the pre-attached retrieval wire, the sampler is brought to the surface. At the surface, the retrieval wire is removed and the sampler is sealed, cleaned, and labeled. Following retrieval, each drill hole is backfilled and patched with cement or asphalt.

TIME CALIBRATION SAMPLERS

Time calibration samplers are included in PETREX soil gas surveys, as appropriate. These samplers are included as a means of monitoring the loading rates of volatile and semivolatile organic compounds (VOCs and SVOCs) emanating from the soil gas at a survey area onto the PETREX collectors.

During PETREX sampler installation, two sets of three to five time calibration samplers are also installed at survey sample locations that best represent the range of soil gas response for the survey area. These representative locations are determined based on previous soils and/or groundwater studies and other site specific conditions such as gradient and potential source areas.

The first set of time calibration samplers are generally retrieved within a week or less following the initial installation and the second set one week later. Often, permanent on-site personnel are instructed to perform time calibration sampler retrieval.

Lengths of exposure periods of the survey samplers for each survey are determined based on the results of each respective set of time calibration samplers. Time calibration samplers are usually analyzed within 24 hours upon receipt at the laboratory. At the first indication of significant relative ion count intensities and significant total ion count values, the decision is made to retrieve the entire complement of survey samplers.

If there are no significant relative ion count intensities detected from the second set of time calibration samplers, then the survey samplers are allowed to equilibrate in the field for a maximum time period of up to 30 days. The average environmental PETREX soil gas survey requires a collector integration period of one day to two weeks.

METHOD QA/QC

Within every survey sampler, the two or three collector wires should have adsorbed identical compounds. Like compounds on separate collectors relate an acceptable quality assurance (QA) during the survey's analysis. The first wire is analyzed by Thermal Desorption/Mass Spectrometry (TD/MS). The data from the first wire is reported on the relative response maps. The second wire is retained for analysis by Thermal Desorption-Gas Chromatography/Mass Spectrometry (TD-GC/MS), if warranted by the initial TD/MS analysis of the second wire.

Approximately ten percent of the total PETREX survey samplers contain three collector wires. The third collector wire, a QC collector wire, is used by the operator to test the mass spectrometer's operating conditions prior to survey analysis. Some of these quality control (QC) collectors are also used to check the mass spectrometer sensitivity during survey analysis. In addition, the QC collector may be used to compare the reproducibility of the detected VOCs.

TRAVEL BLANKS

Two PETREX samplers, each containing a single collector wire, are included with each PETREX soil gas survey as travel blanks. These blanks are analyzed with the survey samplers to indicate whether there may have been contamination introduced to the survey samplers during installation or shipment. If compounds other than normal atmospherics (e.g., CO₂, H₂0, N₂, and Ar) are detected on the blanks, these results are taken into consideration in the data presentation. This process, an initial step to data interpretation, involves the correction of ion count values of the detected blank contaminants from the entire survey's data set. The resulting ion count values are provided on the relative response maps.

MASS SPECTROMETER TUNING

An Extranuclear Quadrupole C-50 Mass Spectrometer or similar instrument, equipped with a Curie-point pyrolysis/thermal desorption inlet, is used for collector analysis. Mass assignment and resolution are manually adjusted using a Perfluorotributylamine (PFTBA) standard or a built-in tuning program, depending on the instrument. A linear correction, based on the known spectrum of PFTBA, is calculated. This correction is applied to a second PFTBA spectrum. If correct mass (M/Z) values are obtained, the operator proceeds to the next tuning step. If not, Step 1 is repeated until correct masses are obtained.

Peak intensity ratios are set from the major peaks in the PFTBA spectrum using the following values:

Mass		Spectrum
(M/Z)		<u>Intensities</u>
69	=	100%
131	=	48% ± 5%
219	=	$50\% \pm 5\%$

During tuning, the ion signal for mass (M/Z) 69 of PFTBA is measured at a preset sample pressure and detector voltage and compared to previous values at the same setting.

Electron energy is set to 70 electron volts. All other operating parameters, such as scans, scan range, and mass offset, are established in the computer program. These values may only be changed by the laboratory manager.

Tuning is performed at the beginning of a run so that an individual survey is analyzed at the same set of instrument conditions. The samplers are analyzed in random order.

LABORATORY ANALYSIS

Periodic machine background and blank PETREX collector analyses are performed to assure that there is no carry-over between successive collectors. If there are peaks present which are not related to atmospheric gases, the supervisor is notified and the mass spectrometer is shut down and cleaned as necessary.

A written sample number record is kept during the analysis to prevent accidental cross numbering. The mass spectrometer control program contains appropriate "flag statements" that prompt the operator with a warning if an input sample number has already been analyzed. The operator then checks the current number, along with the disk storage location of the previously entered number to identify the true numbering situation.

COMPOUND IDENTIFICATION

Compound identification is based on molecular weight, compound fragmentation, and isotope distribution, as applicable. Each VOC exhibits a unique mass spectral signature. NERI maintains a large library of spectra of individual compounds, accessible by computer. In addition, the company maintains a large library of mass spectra of commonly used chemical mixtures; e.g., gasolines, diesels, industrial oils and solvents, coatings, plastics, etc. These spectra are used to assist in both compound and mixture identifications.

The ion count response of an indicator peak(s), representative of the compound and away from interference by other compounds, is extracted for data presentation and mapping.

INTERPRETATION OF SOIL GAS DATA

Soil gas data (including PETREX) reflect volatile and semivolatile organics collected at a point in the near surface. The sources of these volatile organics may be in the stratigraphic column and/or in groundwater below the collection point. Thus, the organics can be derived from surface spills, deposition, or migration into the deeper vadose zone, and groundwater. The soil gas survey reveals the <u>areal</u> extent of contamination and is the optimum guide in identifying areas in order to develop a vertical profile, including the drilling of soil borings and monitoring wells.

Soil gas data are always semi-quantitative in that multiple sources in soil and/or groundwater cannot be differentiated. However, the higher ion responses are representative of higher concentrations in the subsurface, given that geologic conditions are relatively consistent.

Due to chemical differences between individual compounds, including their ability to both adsorb and desorb from the charcoal PETREX collector element, it is invalid to compare the ion count of a compound at one sampling location to that of another compound.

APPENDIX B Tables 1 and 3

Table 1 PETREX Relative Soil Gas Response Values (in ion counts)

North Smithfield ANGS, Slatersville, RI ANEPTEK Corporation

Sample Number	Gasoline	Diesel/Fuel Oil
1	24,564	ND
2	1,375	ND
3	1,430	ND
4	19,912	ND
5	110,879	ND
6	619	ND
7	57,588	ND
8	T	ND
. 9	ND	ND
10	133,322	ND
11	218,077	ND
12	91,825	ND
13	29,778	ND
14	ND	ND
15	10,129	ND
16	61,984	ND
17	43,473	ND
18	2,819	ND
19	21,151	ND
20	63,030	ND
21	5,817,152	136,764
22	535,800	42,911
23	128,554	ND
. 24	114,050	ND
25	2,417,029	628,655
26	675,452	90,690
27	885,217	842,216
28	868,758	190,967
29	50,621	ND
30	1,719,666	9,443,452
31	97,784	84,455
32	68,126	••
33	2,685,389	
34	117,450	
35	987,799	43,149

Table 1
PETREX Relative Soil Gas Response Values
(in ion counts)
North Smithfield ANGS, Slatersville, RI
ANEPTEK Corporation

Sample		
Number	Gasoline	Diesel/Fuel Oil
36	269,056	11,731
37	221,462	8,731
38	T	ND
39	90,507	ND
40	91,196	ND
41	7,190,290	3,117,008
42	329,328	1,151,093
43	402,774	70,630
44	817,531	536,098
45	3,883,497	284,293
46	165,474	ND
47	24,776	1,383
48	2,582,176	168,418
49	635,737	112,997
50	90,223	27,943
51	13,206	6,617
52	45,872	
53	1,437,331	
54	159,397	
55	T	
56	T	
57	Т	
58	T	
59	703,406	
-60	3,667,199	
61	316,573	
62	1,856,655	
63	1,166,522	
64	2,398,249	
65	Ţ	
66	T 7	
67	8,113,850	
. 68	2,630	
69 70	2,0 <i>3</i> (T	
. 70 .71	T.	,
./1		IND

Table 1
PETREX Relative Soil Gas Response Values
(in ion counts)
North Smithfield ANGS, Slatersville, RI
ANEPTEK Corporation

Gasoline	Diesel/Fuel Oil
Т	ND
10,043	ND
14,758	ND
44,733	ND
22,041	ND
3,042	ND
ND	ND
ND	ND .
3,388	ND
ND	ND Travel Blank
ND	ND Travel Blank
	T 10,043 14,758 44,733 22,041 3,042 ND ND 3,388 ND

Notes:

- 1. The C6-C10 aromatics were summed to represent gasoline.
- 2. The C9-C14 aliphatic hydrocarbons were summed to represent diesel/fuel oil.
- 3. ND = Not Detected
- 4. The presence of naturally occurring aromatic terpenes, a class of compounds generated by vegetation, masked the identification of gasoline aromatics. However, review of the mass spectra suggests that there were no other hydrocarbons present that would indicate the presence of gasoline.

Table 3

Additional Compounds Detected in Soil Gas
North Smithfield ANGS, Slatersville, RI
ANEPTEK Corporation

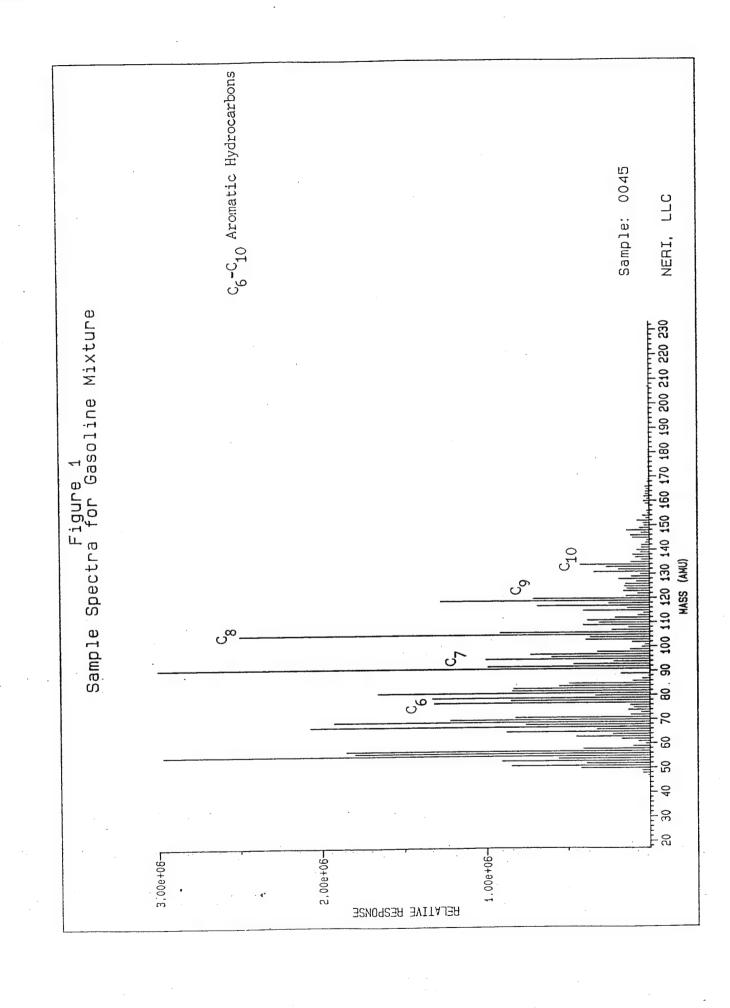
Compound	Sample Location	Relative Response (in ion counts)
TCE	24 74	318,638 24,632
PCE	15 24 36	16,238 26,214 491,484
	37	80,379

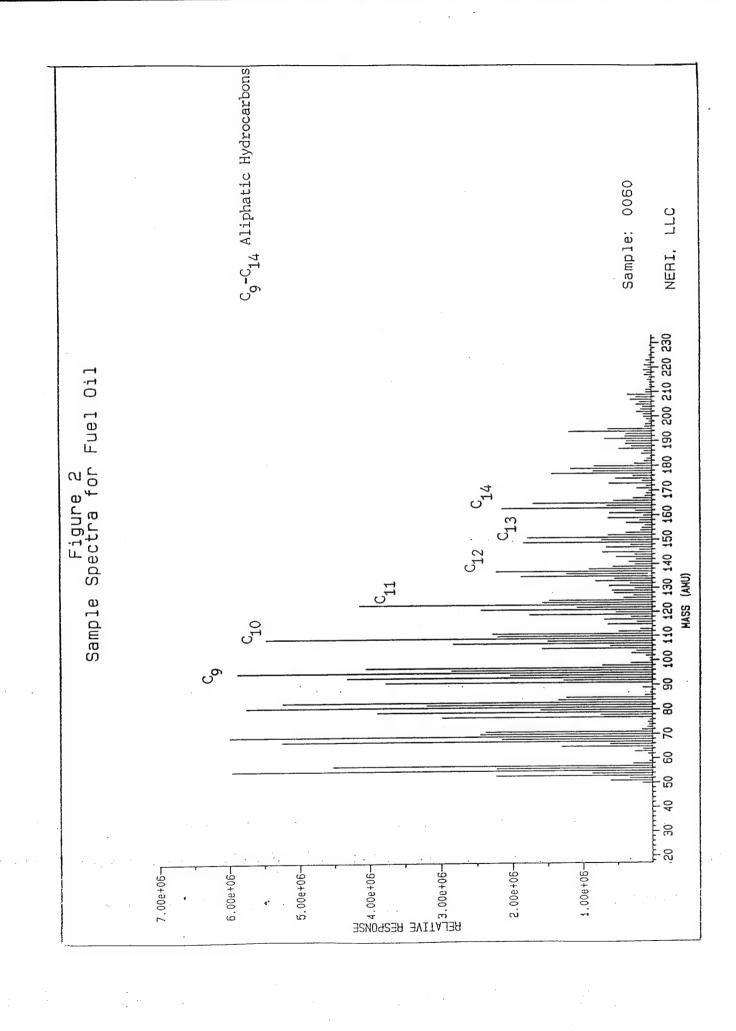
TCE - Trichloroethene Indicator Mass Peak(s) 130

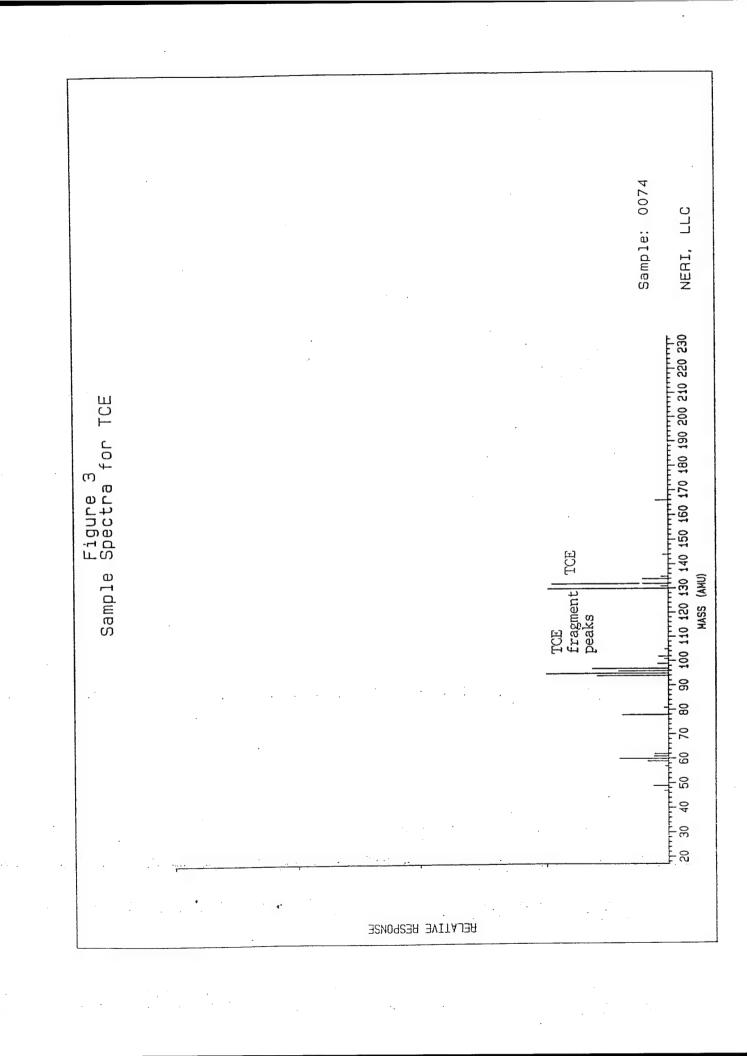
PCE - Tetrachloroethene Indicator Mass Peak(s) 164

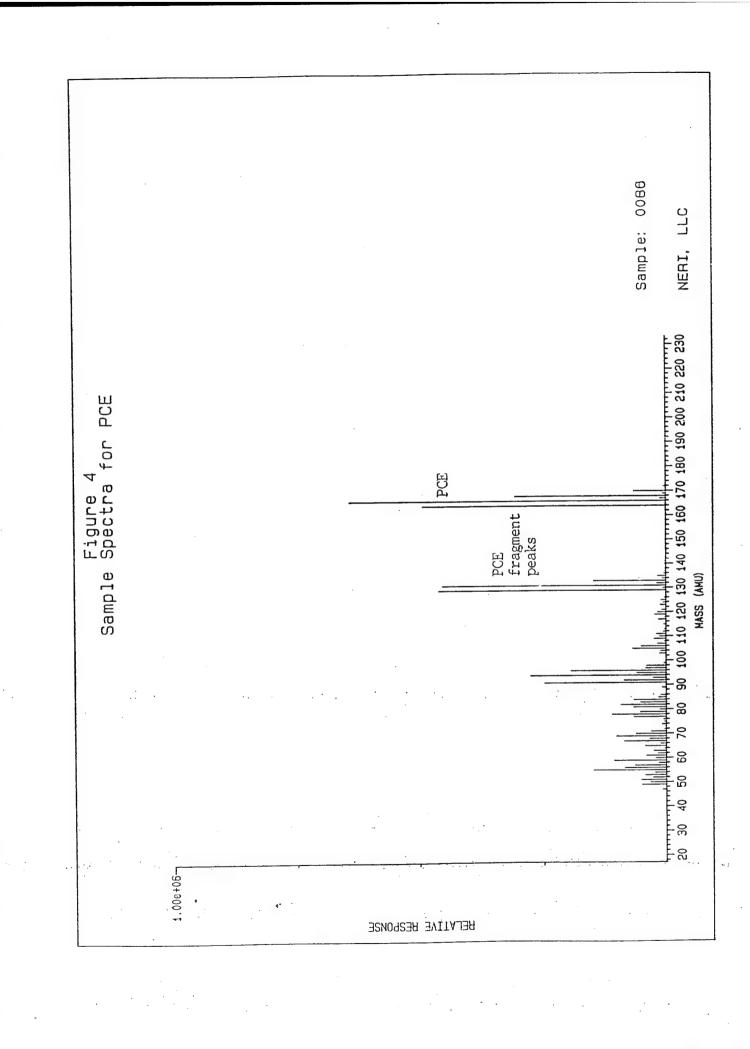
PETREX Soil Gas Survey - Slatersville, Rhode Island	11/28/94
---	----------

APPENDIX C
Sample Mass Spectra of Compounds Identified



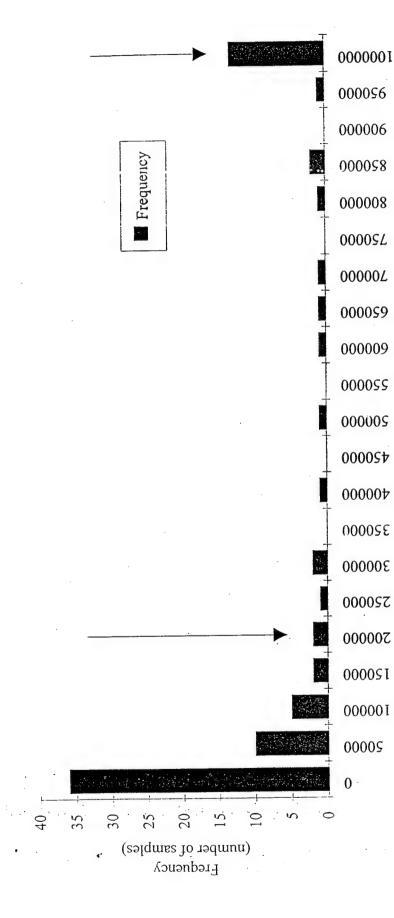






Sample: 0900 NERI, LLC Blank Sample -20 30 40 50 60 70 80 9**0 100 110 120 130 140 150 160 170 180 190 200 210 220 230** MASS (AMU) Figure 5 Sample Spectra for QA/QC Travel 1,00e+05-RELATIVE RESPONSE

APPENDIX D
Histograms Used to Determine Contour Intervals

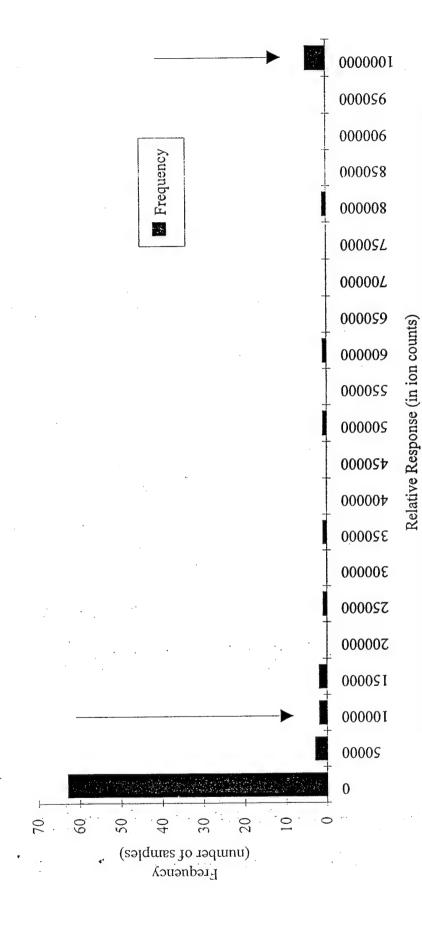


Gasoline Mixture Histogram

Figure 1

Arrows indicate sample population breaks used to establish contour intervals depicted on Plate 2. Relative Response (in ion counts)

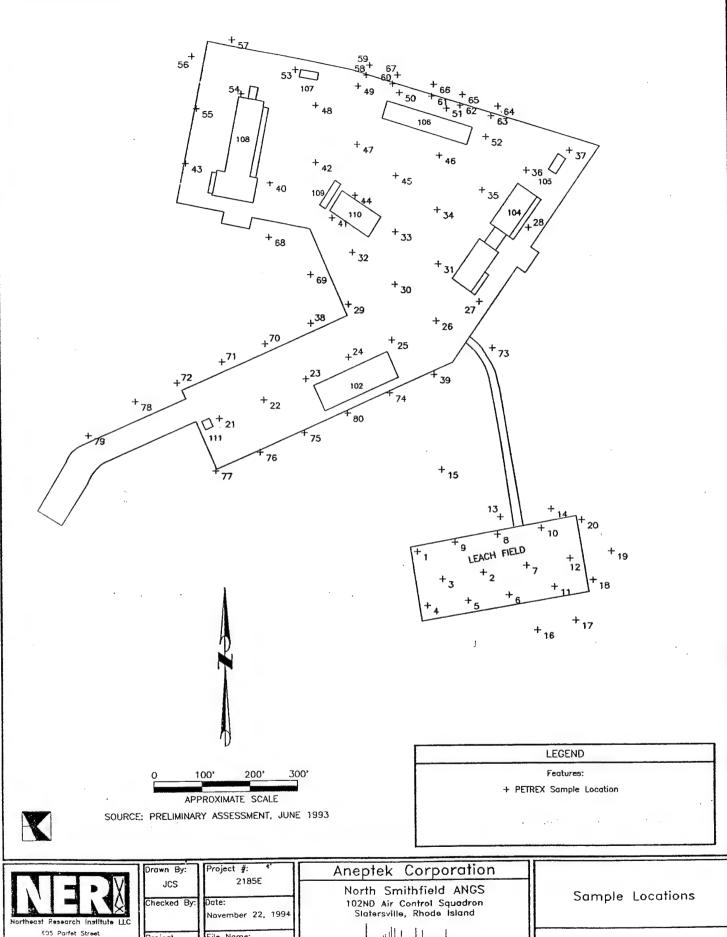
Arrows indicate sample population breaks used to establish contour intervals depicted on Plate 3.



Diesel/Fuel Oil Histogram

Figure 2

APPENDIX E Plates 1-3

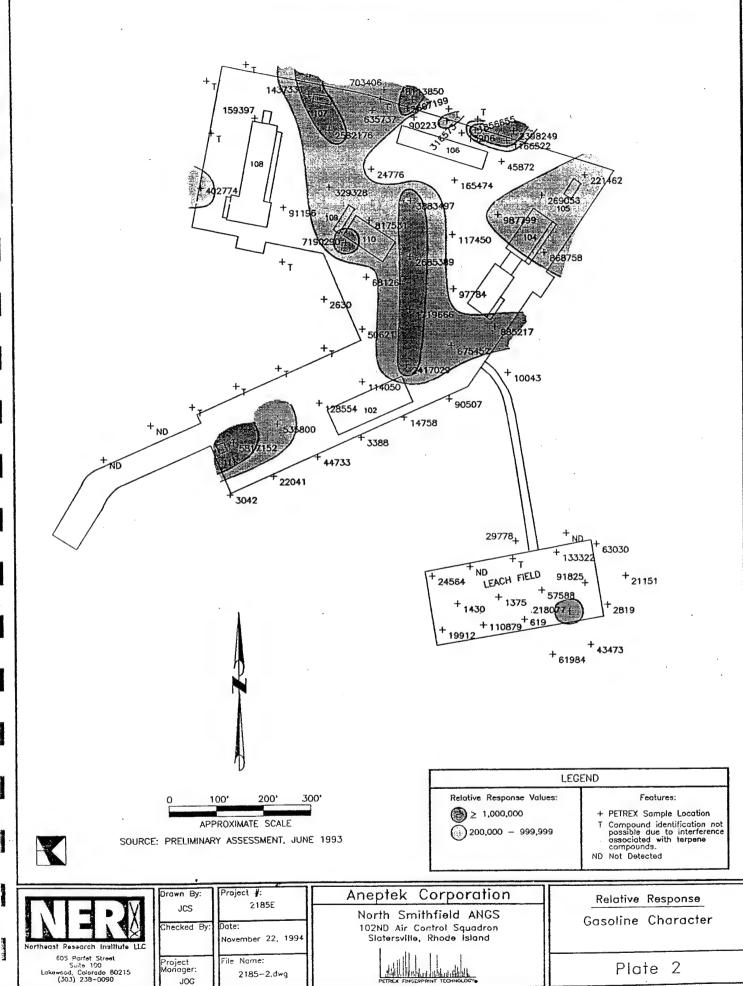


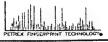
505 Parfet Street Suite 100 Lakewood, Colorada 80215 (303) 238-0090

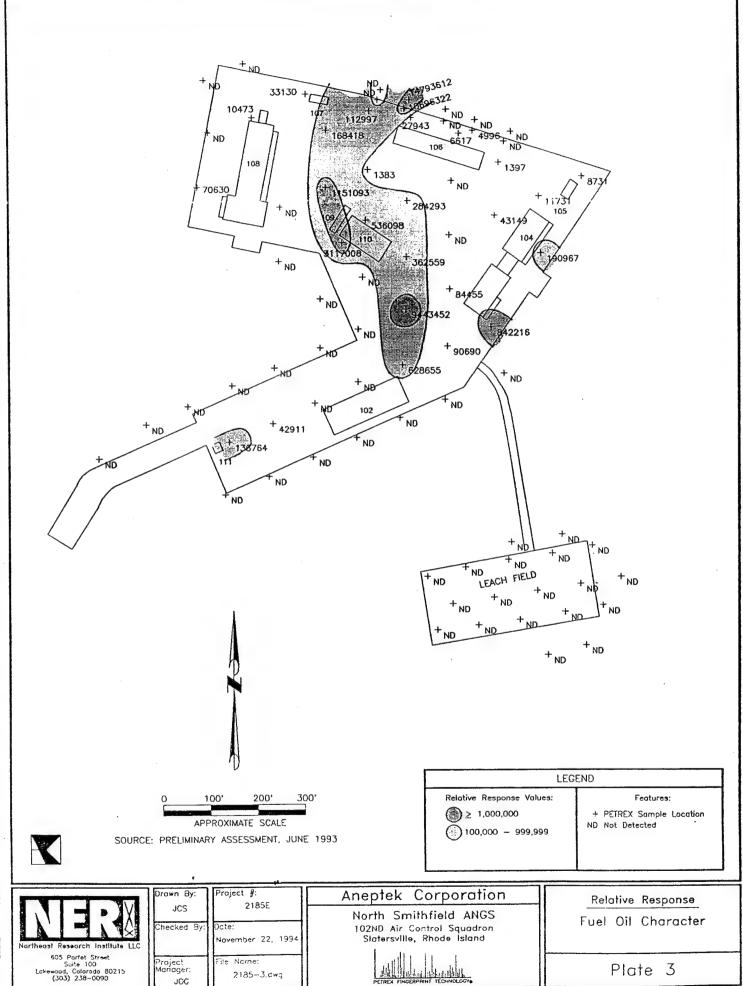
File Name: Project Manager: 2185-1.dwg

JOG

Plate 1







APPENDIX B

FIELD GC SCREENING RESULTS



ECT

Unvironmental Control Technologies, Inc. 90 gdara and Drive Suite 10 Bedford, XII 03110 (603) 668 0707 Fax (603) 668-0707

800-962-3755

101 Federal Street Suite 1900 Boston, MA 02110 (017) 342-3669 Fax (617) 342-7080 800-962-3755

FIELD GAS CHROMATOGRAPHY PROJECT SOIL HEADSPACE ANALYSIS

December 14, 1994

SITE:

North Smithfield Air National Guard Base Slatersville, Rhode Island

ECT Job # ANEPT.01446L3

Prepared for:

Mr. Jeffrey Healey
Program Manager
ANEPTEK Corporation
209 West Central Street
Natick, Massachusetts 01760



Environmental Control Technologies, Inc. 9 Cedura and Drive Suite 16 Bedford, NH 03110 (603) 668-0707 Fax (603) 668-0767 800-962-3755

101 Federal Sivet Suite 1900 Boston, MA 02110 (617) 342-5669 Fax (617) 342-7080 800-962-3755

FIELD GAS CHROMATOGRAPHY PROJECT SOIL HEADSPACE ANALYSIS North Smithfield Air National Guard Base Slatersville, Rhode Island

INTRODUCTION

ECT has completed a Field Gas Chromatography Project at the above-referenced property (SITE) at the request of Mr. Jeffrey Healey of ANEPTEK Corporation (Client). This report is subject to the Limitations attached in Exhibit A.

This Field Gas Chromatography Project was conducted between November 29 and December 6, 1994, in order to identify volatile hydrocarbons and chlorinated solvents, specifically benzene, toluene, ethyl benzene, xylenes (BTEX), trichloroethene (TCE), 1,1,1-trichloroethane (TCA), dichlororethene (DCE), and perchloroethene (PCE), in sample headspace from soil samples collected at the SITE. ECT tested 40 soil samples on SITE (see RESULTS in TABLE 1) provided to ECT by the Client. A set of the sample chromatograms are provided in Exhibit B.

INSTRUMENTATION

An SRI Model 8610 gas chromatograph (GC), equipped with a 15-meter capillary column and photoionization detector (PID) was used to analyze samples on SITE. Data was acquired with an SRI Peak II computer-based software system.

METHODOLOGY

Method blanks and standards were analyzed daily to maintain quality control. A calibration was established based upon a standard prepared with BTEX, TCE, TCA, DCE, and PCE obtained from Supelco, Inc.

Identification of the analytes is based on a comparison of the retention times for the detected peaks against those associated with the calibration standard. Calibration standards were generally analyzed at the beginning and end of each day, after 8 to 10 samples, and after a transfer of the mobile laboratory to a new Area of Concern (AOC).

Page 2 North Smithfield ANG Slatersville, Rhode Island ECT Job #ANEPT.01446L3

Quality Assurance/Quality Control

In order to evaluate the precision of the sampling and analytical methodology, samples of a 21.75 ug/l of benzene to 41.5 ug/l of perchroloethene calibration standards were analyzed at the beginning and end of each day as well as after every 8 to 12 samples analyzed. The concentration for toluene in the standard samples ranged from a low of .134 mg/l to a high of .171 mg/l (relative percent difference range of 12.2 to 12.9 %) while the total xylenes concentration ranged from a low of .732 mg/l to a high of .961 mg/l (relative percent difference range of 13.5 to 14.1 %).

Soil Samples

Approximately 2 mls of each soil sample were collected by the Client and associated sampling subcontractor, from split-spoon samples collected from the borings, and transferred into a 40 ml VOA vial containing 30 mls of distilled water. After resealing the vial, it was agitated for one minute and placed in a water bath at 40° C for five (5) minutes allowing the headspace to reach equilibrium. Subsequently, a 200 ul aliquot of sample was injected into the GC for analysis. Results were calculated as parts-per-billion (ppb).

Supporting materials follow.

ENVIRONMENTAL CONTROL TECHNOLOGIES, INC.

Andrew C. Tingley

Project Manager/Hydrogeologist

enclosures

			TABLE					
		S(FIELD GAS	SOIL HEADSPACE S CHROMATOGRAPY	N	RESULTS	-		
-	Z	North Smith Slater	Saithfield Air Slatersville, Rho	lr National G Rhode Island	Guard Id		,	
SAMPLE ID	SB-01-	SB-01- 04	SB-01- 06	SB-01- 08	SB-02- 02	SB-02- 07	SB-03- 04.5	SB-03- 08.5
SAMPLE DEPTH (in feet)	0-2	2-4	4-6	6-8	0-2	5-7	2.5-4.5	6.5-8.5
DATE SAMPLED	11/29/94	11/29/94	11/29/94	11/29/94	11/29/94	11/29/94	11/30/94	11/30/94
DETECTOR	DIG	DIG	PID	PID	PID	PID	PID	PID
HATRIX	SOIL	SOIL	SOIL	SOIL	TIOS	SOIL	SOIL	SOIL
ANALYTE		2	Concentrations	(in	parts per	per billion)		
Benzene	QN	QN	QN .	ND	UN	UD	UND	ND
Toluene	QN	QN	QN	QN	UN	QN .	UND	QN
Ethylbenzene	QN	ND	QN	ND	QN	ND	ND	ND
Total Xylenes	QN	141	364	80	UN	93	ND	ND
Dichloroethene	QN	UND	UN	ND	QN	ND	QN	ND
Trichloroethene	QN	UND	UND	QN .	ND	QN	ND	ND
Trichloroethane	QN	UND	QN	ON .	UN	UD	ND	ND
Tetrachloroethene	ND	QN	QN	ΩN	ND	UN	ND	ND
# of Unknowns/ Estimated Range	104	327-1967	19 310-3875	11 227-975	1 . 581	3 133-1866	ND	ND
PID = Photononization detector								

PID = Photoionization dotection with MD = Not Detected

		TAE	TABLE 1 (con	(continued)				
		S FIELD GAS	SOIL HEADSPACE		RESULTS			
		North Smith Slater	Slatersville, Rh	Air National G , Rhode Island	Guard Id		-	
SAMPLE ID	SB-03- 10.5	SB-03-	SB-04- 02	SB-04- 09	SB-05-	SB-05- 06.5	SB-05- 12	SB-05- 16
SAMPLE DEPTH	8.5-10.5	10-12	0-2	7-9	0-2	4.5-6.5	10-12	14-16
DATE SAMPLED	11/30/94	11/30/94	11/30/94	11/30/94	11/30/94	11/30/94	11/30/94	11/30/94
DETECTOR	GIG	GIA	QIA .	OI4	PID	PID	PID	PID
HATRIX		SOIL	SOIL	SOIL	SOIL	ROIL	ZOIL	SOIL
EXPERIENCE TO THE ANALYTE		Ü	Concentrations	(1n	parts per	billion)		
Benzene	QN	ND	ND	ND	ND	UD	UND	ND
Toluene	QN	ND	. QN	ND	ND	ND	ND	QN
Ethylbenzene	QN	164	UD	111	ND	QN	QN	ND
Total Xylenes	QN	QN	.QN	ND	QN	390	528	1430
Dichloroethene	ON	QN	QN	ND	ND	ND	UND	QN
Trichloroethene	ND	ON	QN	QN	ND	ND	QN ·	ND
Trichloroethane	QN	ND	ND	QN	ND	ND	ND	ND
Tetrachloroethene	QN	QN	UN	1207	ND	1190	ND	ND
# of Unknowns/ Estimated Range	ΩN	QN	QN	1028	NO	923	307	202+282

PID # Photolonization detection by No. 10 Detected

		TABLE	LE 1 (continued)	funed)				
		SO EIELD GAS	ដូដ		RESULTS			
		North Smithfield Slatersville	field Air	Air National Guard , Rhode Island	Guard			
SAMPLE ID	SB-06- 02	SB-06- 07	SB-06-	SB-07- 02.5	SB-08- 02.5	SB-08- 07.5	SB-09- 02.5	SB-09- 07.5
SAMPLE DEPTH	0-2	5-7	10-12	. 0.5-2.5	0.5-2.5	5.5-7.5	0.5-2.5	5.5-7.5
name Sampren	12/1/94	.12/1/94	12/1/94	12/1/94	12/1/94	12/1/94	12/2/94	12/2/94
achoanau	DIG	PID	PID	QId	PID	PID	PID	PID
HATRIX	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL SOIL	SOIL
ANALYTE		ŭ	Concentrations	(Lů	parts per	billion)		
anaphad	QN	QN	QN	GN :	MD	QN .	UN	ND
aren Lon	QN	QN	UND	QN	QN	QN .	ND	ND
T+hv]henzene	QN	ND	ND	QN	QN	QN .	ND	110
motal Xvlenes	QN	55	129	UN	ON	287	ND	92
nichloroethene	QN	UND	QN	UN	ND	ND	UD	ND
mrichloroethene	ND	UND	QN	ON	UND	QN	QN	ND
Trichloroethane	QN	QN	QN	UN	QN	QN	UN	ON
Tetrachloroethene	QN	QN	QN	UND	UN	UND	ND	QN
# of Unknowns/	509	74+407	101+336	1 168	QN	ND	DN	2 92+335
YY Distriction and article defector								

NYO = Photolonization dutector

		TABLE	1	(continued)	-			
		SC FIELD GAS	SOIL HEADSPACE S CHROMATOGRAPY		RESULTS			
	z	North Smithfield Slatersville	4	lr National G Rhode Island	Guard		-	
SAMPLE ID	SB-09-	SB-10- 02	SB-10- 04	SB-10- 06	SB-10- 08	SB-11- 02	SB-11- 07	SB-11- 12
SAMPLE DEPTH	10-12	0-2	2-4	4-6	 9-9	0-2	5-7	10-12
DATE SAMPLED	12/2/94	12/2/94	12/2/94	12/2/94	12/2/94	12/5/94	12/5/94	12/5/94
DETECTOR	PID	PID	GIA	PID	PID	PID	DIG	PID
HATRIX	SOIL	TIOS.	SOIL	SOIL	SOIL	SOIL	SOIL	soir . SOIL
ANALYTE		ρ	Concentrations	(1n	parts per	billion)		
Benzene	QN	QN	ND	UND	UD	UND	ND	ND
Toluene	ND	QN	ND	UN.	QN	QN	ΩN	ND
Ethylbenzene	QN	QN	QN	ND	QN	ND	QN	ND
Total Xylenes	QN	QN	175	520	87	UD	240	ND
Dichloroethene	ND .	UD	ND	ND	QN	UD	ND	ND
Trichloroethene	ND	QN	ND	ND	QN	QN	UND	ND
Trichloroethane	ND	QN	ND	QN	ND	ND	142	QN
Tetrachloroethene	QN	QN	ND	572	ND	UN	ND	ND
# of Unknowns/ Estimated Range	96+108	UN	121-1373	14 163-7868	57-579	125-585	22 67- 16,949	3 204- 4489
TO TOO TOO TOO TOO TOO TOO TOO TOO TOO								

PID = Photolonization detector ND = Not Detected

		TAB	TABLE 1 (continued	(penut:				
		FIELD GAS	SOIL HEADSPACE GAS CHROMATOGRAPY	PACE SRAPY RESULTS	ILTS			
	Z .	North Smith Slater	rth Smithfield Air National Guard Slatersville, Rhode Island	ir National G Rhode Island	Guard d		-	
SAMPLE ID	SB-12- 02	SB-12- 07	SB-12- 12	SB-13- 02.5	SB-13- 07	SB-13- 10.5	SB-14- 02.5	SB-14- 07
SAMPLE DEPTH	0-2	5-7	10-12	0-2	5-7	8.5-10.5	0-2	5-7
ATTENDED TO THE SAMPLED	12/5/94	12/5/94	12/5/94	12/6/94	12/6/94	12/6/94	12/6/94	12/6/94
achoanan	PID	PID	PID	PID	PID	PID	PID	PID
MATRIX	SOIL	SOIL		ros	SOIL	SOIL	SOIL	SOIL SOIL SOIL
ecceptum marketam marketam ANALYTE	en en de la companya		Concentrations	(in	92	billion)		
Benzene	ΩN	QN	QN	ND	ND	UND	UD	ND
moluene	ND	QN	QN	QN	ND	ND	ND	QN
Rthv1benzene	QN	QN	QN	QN	ND	QN.	UD	QN
Total Xylenes	ND	QN	QN	UN	ND	ND	QN	QN
	QN	GN.	. QN	UND	ND	QN	ND	ND
Trichloroethene	QN	QN	, · QN	ND	QN	QN	ND	ND
Trichloroethane	ND	ND	UD	ON .	UD	UD	ND	ND
Tetrachloroethene	QN	QN ,	UD	ND	UD	ND	ND	QN
# of Unknowns/ Estimated Range	2 .	2 491+3081	3 765-2956	142+1900	377-1387	5 164-7010	2 74+89	3 61-244
						·		

EXHIBIT A

EXHIBIT A

LIMITATIONS

- 1. The conclusions and recommendations contained in this Field Gas Chromatography report are based solely on conditions that existed at the time of the survey and on the services provided, and are not based on scientific tasks or procedures beyond those described or beyond the budgetary and time constraints imposed by ANEPTEK Corporation (Client). The stated conclusions and recommendations represent the best professional judgement of Environmental Control Technologies, Inc. (ECT) and should not be construed as statements of scientific certainty. Specifically, ECT does not and cannot represent that the SITE contains no asbestos containing materials; solid waste; hazardous materials, substances, or wastes; petroleum products or other latent conditions beyond those observed during this Field Gas Chromatography report. No other warranty, expressed or implied, is made.
- This Field Gas Chromatography report approximates environmental conditions at the SITE. Moreover, contamination and sources of contamination may not yet have manifested themselves at the time of the survey. In addition, ECT can not predict which potential issues will become actual problems, legal or otherwise, because laws and enforcement priorities may change and environmental conditions at the SITE may also change over time.
- 3. The analyses and conclusions in this report may be based in part upon chemical test data provided by other sources referenced herein and are contingent upon their validity. ECT did not attempt to independently verify the truthfulness, accuracy or completeness of all information reviewed or received during this study, and EDT disclaims any liability that may arise from its reliance on such information.
- 4. Observations were made of the SITE as indicated in this report. Where access to portions of the SITE was unavailable or limited, ECT renders no opinion as to the presence or potential presence of hazardous materials, substances or wastes, or petroleum products in those portions of the SITE.
- 5. This Field Gas Chromatography report did not include an investigation as to whether any and all activities performed on the SITE have been granted all required environmental permits or licenses, or are or have been conducted in compliance with any or all applicable environmental laws and regulations. Accordingly, ECT makes no representations and offers no opinions as to whether any and all activities performed thereon are, or have been, conducted in compliance with all applicable environmental laws and regulations.

- 6. Inspections for asbestos containing materials (ACM), airborne radon and lead paint are outside of the scope of this Field Gas Chromatography report, however, to the extent that ECT becomes aware of the potential presence of one or more of these materials as a consequence of our visual inspection or record review, ECT will report this information to Client.
- 7. This Field Gas Chromatography report was prepared solely for the exclusive use of Client in accordance with generally accepted scientific practices strictly for use as a preliminary environmental evaluation of the SITE, and no other party may rely upon the information contained herein. ECT acknowledges and agrees that Client may convey this report to the seller, Title Insurer or others directly associated with the transaction of the SITE. No warranty, expressed or implied, is made or extended to any such third parties, all of whom may rely upon the information in this report at their own risk and without any legal recourse against ECT, its officers, directors, employees or agents, regardless of the legal basis for their claims; provided, however, that no third party may rely upon this report unless it agrees to be bound by these terms. To the extent that any warranty is made in this Field Gas Chromatography report, it may not be assigned by Client to any other party.
- 8. ECT makes no guarantee, warranty, or other representation that this report will necessarily be found in a judicial process to satisfy the "all appropriate inquiry" standard set forth in the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. Section 9601 et seq., or in its analogues set forth in comparable state or local statutes, ordinances, rules, or regulations.

EXHIBIT B

tab name: ECT Mobile J
Client: AMEPTEK
Client ID: 01446.L3
Collected: 11/29/94
Holding time: < 24 hrs
Analysis date: 11/29/1994 12:15:47
Method: Direct Injection
Description: AMEPTEK - No. Smithfield
Entumn: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: AMEPB2.CHK (c:\chrum\data\aneptek)
Sample: 200 ul yapor
Operator: Andrew lingley

;	eiobl ;	01.200m ⁰			May or Oak	Eceponent 1	Retention	lirea	External
Į	12. 1					(tunksonn)	0.983	575.78	N/A
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Lab name: ECT Mobile 1
Client: AMEPTEK
Client ID: 01446.L3
Collected: 11/29/94
Holding time: < 24 hrs
Analysis date: 11/29/1994 12:45:02
Method: Direct Injection
Description: AMEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: AMEPES.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

Reight	-51.200mV		312,000mV	Communent	Retention	Area	External
??. 1				lunkeem)	0.700	522.41	N/A
-	-	4					
3							
Ş)							
19.079				(unkaoun) .	5.756	249.94	N/A
. 6	- j						
15. 7	- 🖏			llunknovn)]	7.150	308.43	N/A
7. 8				l liunknoun) l	7.988	182:15	R/A
17.972	-			(uaknesa)	9.333	477.62	A/K
7.555 10	<u> </u>			(unknosn)	9.866	103.85	. N/A
11. 11 12.341	-			(unknown) Lylene3	11.900 11.266	216.45 215.17	N/A 21.53
8. 12	- 🥎			 լրականություն 	11.750	201.00	N/A
8. 13	_			(unknoan)	12.933	134.27	N/A
12.638 22.556 18. 14 11.357					13,383 13,750 13,950 14,383	222.61 336.67 291.35 210.06	n/a n/a n/a n/a
25. 15	- Y			(enkrosa)	15.000	433.96	N/A
6.385 161- 7.543	- 3			(unknown)	15.750	105.34	N/A
7.545				(rzondani 	16.083	132.97	N/A
12. 17 10.878		•		(un) ១០មក) (un) ១០មក)	17.195 17.590	219.97 139.98	N/A D/A
12.207 12.207				(unl agen)	18,986	294.25	1779 1774
1.				1			

Lab name : ECT Mobile ! Client : ANEFTEK Client ID: 01446.L3
Collected: 11/29/94
Holding time: < 24 hrs
Analysis date: 11/29/1974 13:11:55
Method: Direct Injection
Description: ANEPTER - No. Smithfield
Column: HXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEPB4.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

-51. Weicht	200mV	512.000mV	Component	Retention	Area	External
256. 1	r, mitage i rains — alan sa rainsan rainsan naman naman ingga pag-paga bean-amana, panga sapanga sapanga s		(unknown)	9,900	1416.10	H/A
2						
1					•	
25. 5			(unknown)	5.233	352.35	N/A
6						
13. 7			(unknoun)	7.133	232.39	N/A
8. 9			(unknowa)	7.756	204.15	H/A
79— 15.783	5		(unknosa)	9.316	531.68	ħ/ā
16.875 15. 10			i (lunknown) Rylenei i	9.783 19.133	251.48 242.05	N/A 27.17
14.11			(unknoun) ăvleneš	10.96 <u>6</u> 11.283	310.33 178.44	N/A 19.85
10.755			(unknown)	11.966	231.76	N/A
7. 13	ð		 (មកដែលមក)	12.883	147.94	N/A
11.615 22.059 17.141			lunknown) Tri We Benzene Tri We Benzene	13,383 13,733 13,900 14,264	261.71 424.13 222.43 145.71	N/A N/A 0.03 N/A
25-402 15			(lunknosn)	14.933	429.85	N/Ā
12.977			unknown	15.556	219.39	N/A
11. 17			(unknown)	17.133	305.64	N/A
13. 186 17. 865			Kunkuesa) Rankaesa)	17-856 18-683	146.34 172.21	11/A 11/A
11.751			liunksusa:	18.846	236.48	11/A

Lab name: EUT Mobile 1
Client: AMEPIEK
Client ID: 01446.L3
Collected: 11/29/94
Holding time: < 24 hrs
Analysis date: 11/29/1994 13:39:47
Method: Direct Injection
Description: ANEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEPBS.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

Height _[]	51.200mV	312.000mV	<u>Congonent</u>	Retention	Area	External
197. 1			(unknosn)	0.700	961.37	n/A
. 2	.					
3						
1			, p			
,			at the second of			
5						
4						
9. 7			(unknown)	7:166	134.43	Wā
5. 8	- 19 - 19		(unknown)	7.850	133.92	11/A
13.352			(unknowa)	9.383	326.31	N/A
10						٠.
- 111- 7.544	- : } - : } - : }		Avlene3	11.316	123.12	12.32
á. 12			(unkasen)	12.016	112.25	4/4
13	1					
5.61.			(lunknawn)	13.533	114.42	N/A
h. 14			(และสิเกษ)	14.016	127.46	N/A
15						
				•		
16]_						
7.345 171 7.488			(ម្យាក់តិចនព)	16.683	160.72	N/A
,			ใบกรักอุรกัว	17.216	160.85	N/A
7.799			(unincen)	19.133	105.00	A/R
	*As					

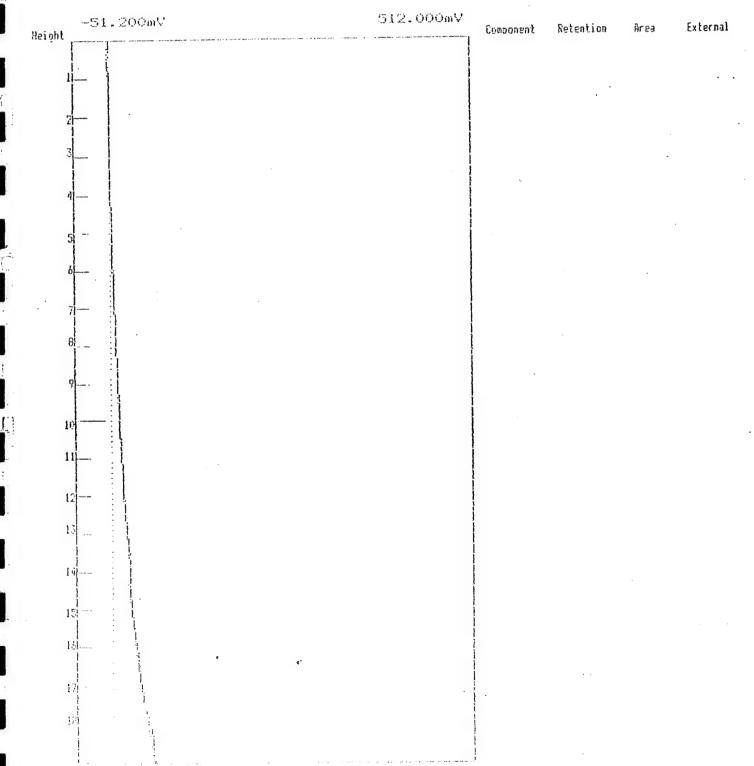
Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 11/29/94
Holding time : < 24 hrs
halysis date : 11/29/1994 16:45:59
Method : Direct Injection
Description : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 H
Carrier : Nitrogen
Data file : ANEPB9.CHR (c:\chrom\bata
Sample : 200 ul vapor Holding Lime: Analysis date: Nitrogen Nitrogen ANEPB9.CHR (c:\cbrom\oata\aneptek) 200 ul vapor Andrew Tingley Sample Operator

-51.200mV Companent Retention Area External Height 10 111. 12 13 11 15 161. 17 MA 1. 18 17.993 125.59 Hunknoon?

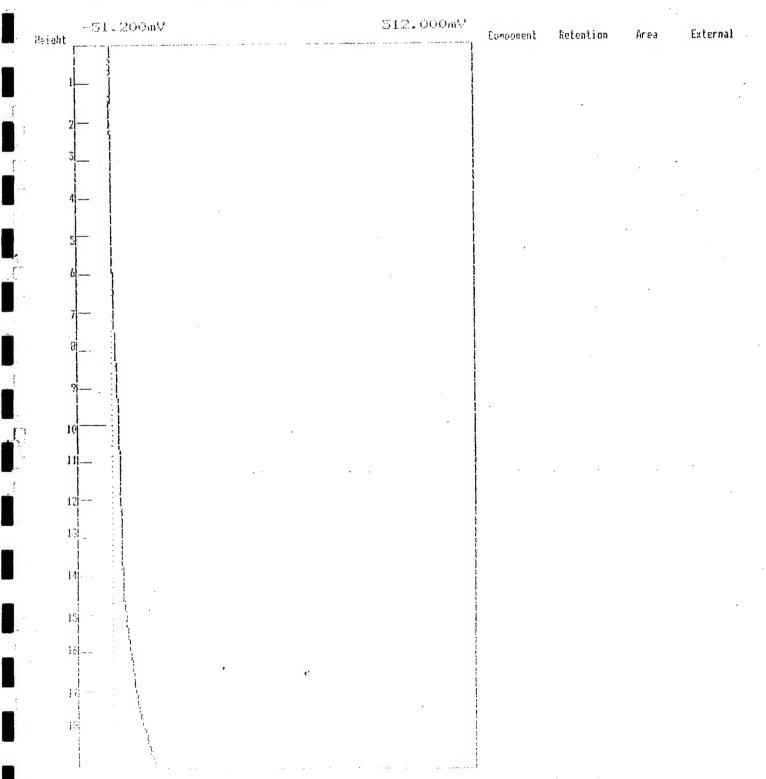
512.000mV

Lab name: ECT Mobile 1
 Client: ANEFTEK
Client ID: 01446.L3
Collected: 11/29/94
Holding time: < 24 hrs
Analysis date: 11/29/1994 17:12:18
 Method: Direct Injection
Description: ANEFTEK - No. Smithfield
 Column: MXT-1 0.53mm x 15 H
 Carrier: Mitrogen
Data file: ANEPBIO.CHR (c:\chrom\data\aneptek)
 Sample: 200 ul vapor
Operator: Andrew Tingley

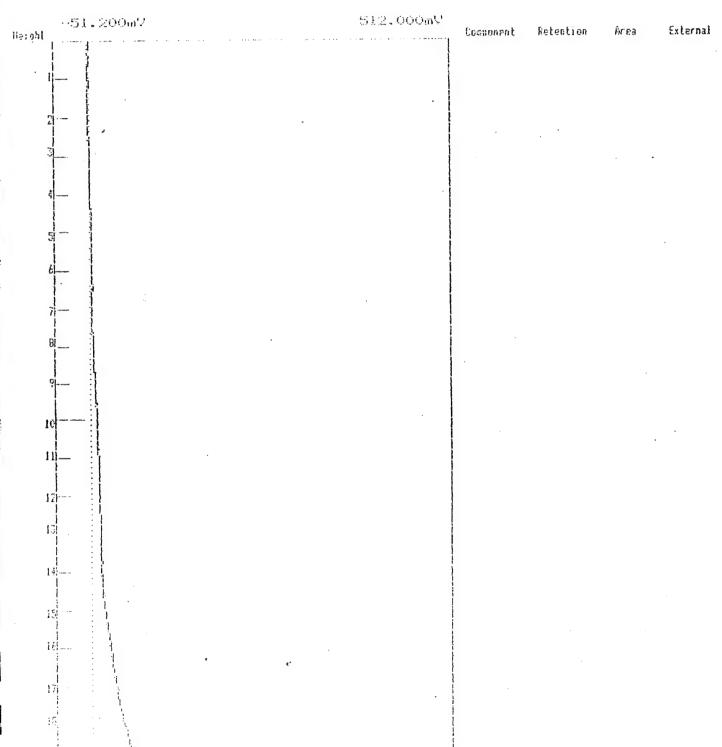
-51.200mV	512.000mV	Commont	Retention	Area	External
1.545		(lenkagua)	1.233	101.97	n/a
z \ \		£			
5		A man of the control			
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61					
71 — 3					
		Kun kun un \	० नहर	201 #6	11/5
5.310 4. 10		(unknown) Kylenel	9.733 9.966	581.49 109.94	12.21
	•	a developing against the developing and developing	•		
12		A-10-01-01-01-01-01-01-01-01-01-01-01-01-			
17		is a page common and a page co			
16					
15		garige . vivo e delegra			
16					
6.5.59 6.5.59		(lunkuova)	17.083	113.98	R/A
		•			



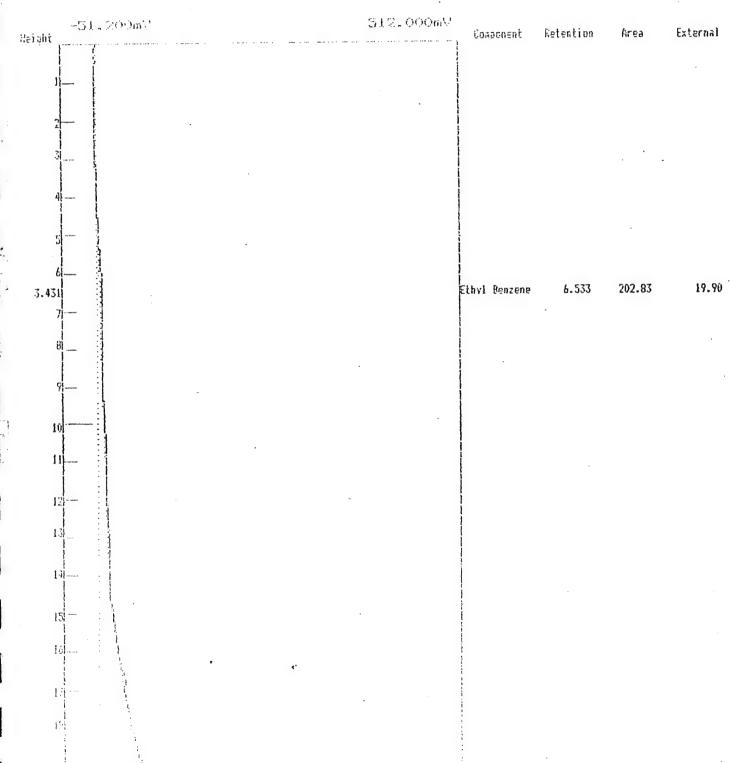
Lab name: ECT Hobile 1
Client: ANEFTEK
Client ID: 01446.L3
Collected: 11/30/94
Holding time: < 24 hrs
Analysis date: 11/30/1994 12:56:57
Nethod: Direct Injection
Description: ANEFTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEFC2.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley



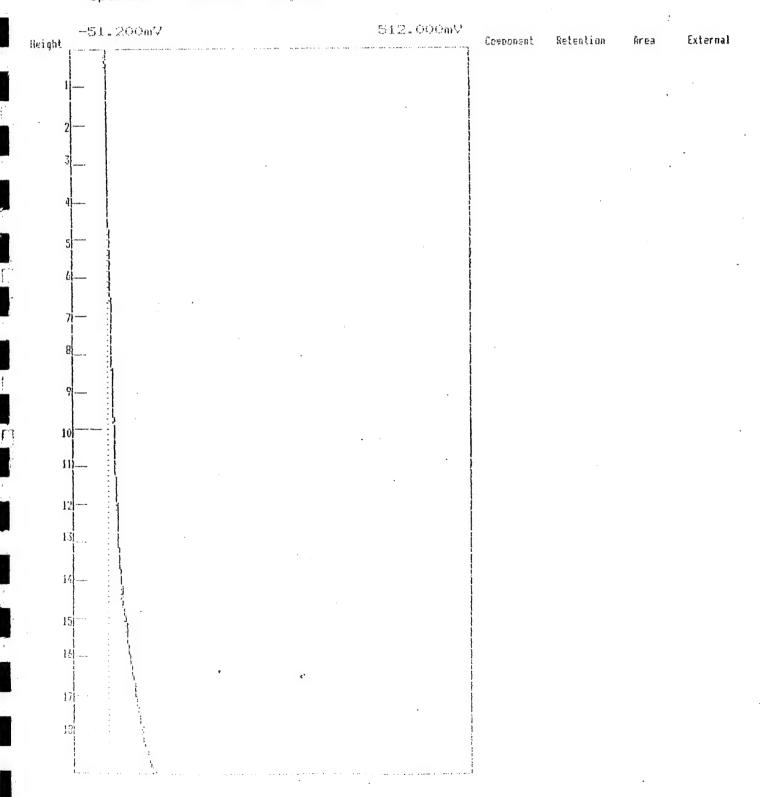
Lab name: ECT Mobile 1
 Client: ANEFTEK
Client ID: 01446.L3
Collected: 11/30/94
Holding time: < 24 brs
Analysis date: 11/30/1994 13:23:18
Method: Direct Injection
Description: ANEFTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 N
Carrier: Nitrogen
Data file: ANEPC3.EHR (c:\cbrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley



Lab name: ECT Mobile 1
 Client: ANEPTEK
Client ID: 01446.L3
Collected: 11/30/94
Holding time: < 24 hrs
Analysis date: 11/30/1994 13:49:32
 Method: Direct Injection
Description: ANEPTEK - No. Smithfield
 Column: MXT-1 0.53mm x 15 M
 Carrier: Nitrogen
Data file: ANEPC4.CHR (c:\chrom\data\aneptek)
 Sample: 200 ul vapor
Operator: Andrew Tinoley



Lab name: ECT Mobile 1
 Client: ANEFTEK
Client 1D: 01446.L3
Collected: 11/30/94
Holding time: < 24 hrs
Analysis date: 11/30/1994 15:31:17
 Method: Direct Injection
Description: ANEPTEK - No. Smithfield
 Column: MXT-1 0.53mm x 15 M
 Carrier: Nitrogen
Data file: ANEPC5.CHR (c:\chrom\data\aneptek)
 Sample: 200 ul vapor
Operator: Andrew Tingley

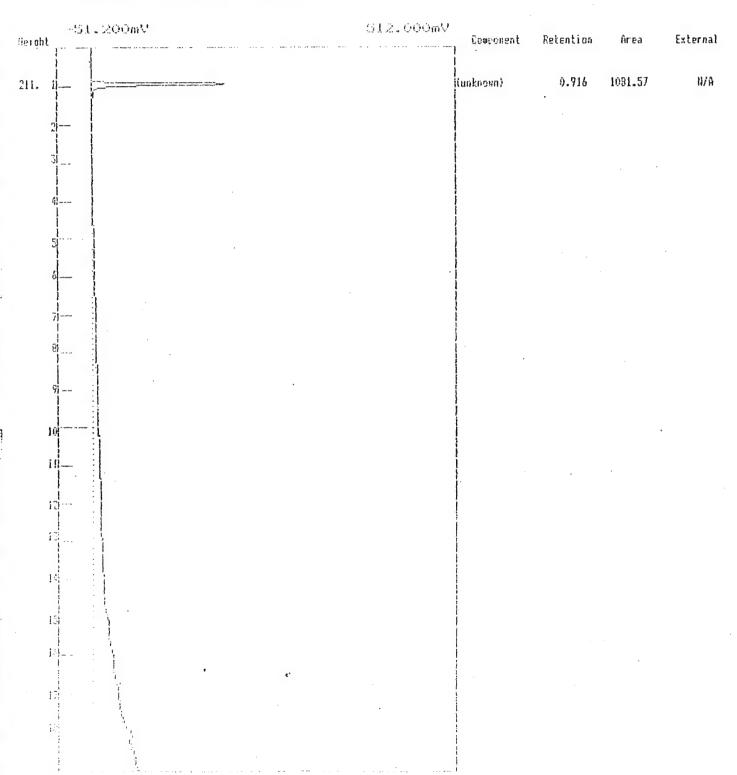


Lab name: ECT Hobile 1
Client: ANEPTEK
Client ID: 01446.L3
Collected: 11/30/94
Holding time: < 24 hrs
Analysis date: 11/30/1994 15:56:51
Method: Direct Injection
Description: ANEPTEK - No. Smithfield
Column: NXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEPCS.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

Height	-53.1	L.200mV			512.000m) Component	Retention	Area	External
£5 .	1	<u> </u>				(առեռուո)	. 10.700	315.70	N/A
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	5	477							
3.7	61					Ethyl Senzens	6.550	160.65	15.76
s.3	E					FCE	8 1,350	951.24	170.50
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	11			•					
	12								
	13								
	14								
	15								
	16		•	₹*					
	17	1 1							,
	16								

Lab name : ECT Mobile 1 Client : ANEFTEK Client: ANCETEK
Client ID: 01446.L3
Collected: 11/30/74
Holding time: < 24 brs
Analysis date: 11/30/1994 17:32:08
Method: Direct Injection
Description: ANEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M

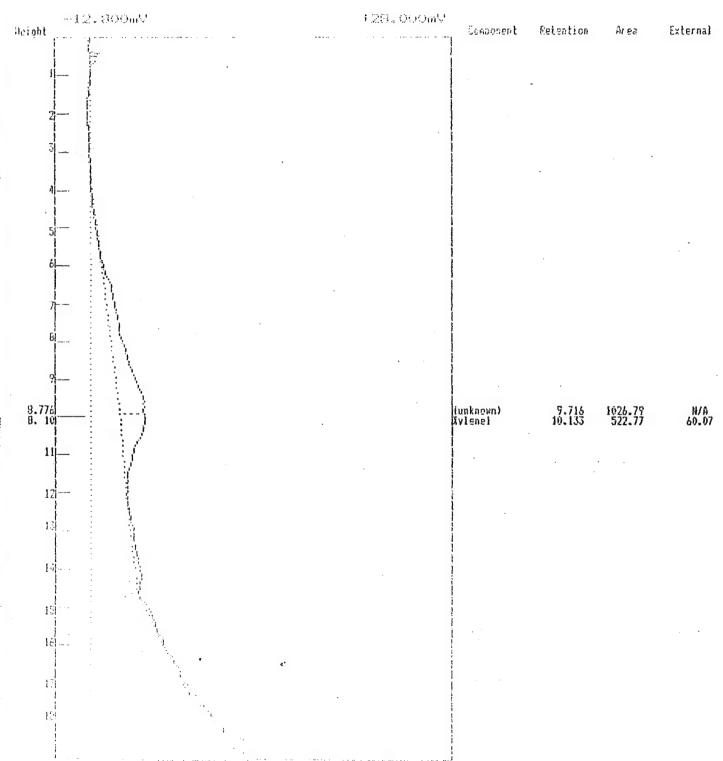
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEPC7.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley



Lab name: ECT Mobile 1
Client: ANEFTEK
Client 1D: 01446.L3
Collected: 11/30/94
Holding time: < 24 hrs
Analysis date: 11/30/1994 17:57:29
Method: Direct Injection
Description: ANEFTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Witrogen

Column: MXT-1 0.53mm x 15 M Carrier: Mitrogen Data file: ANEFC8.CHR (c:\chrom\data\aneptek) Sample: 200 ul vapor Operator: Andrew Tingley

lleight	-51	200mV	Company of the Compan	512.000mV	Corespent	Retention	Area	External
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		·						
5.5	5				FCE	9,165	483.75	75.69
	-				(unknosn)	9.600	428.64	N/A
- 6.4 5.	10				%ylenei	9.956	281.13	31.75
}	11 1					·		
:	13	ì						
	14				(ຍກຂັກໆພາ	14.018	115.67	N/A
	15							
	17		e*					
	1			, 				



Berght 	-25.500mV	255.000mV	Copponent	Retention	Ar ea	External
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2						
7	:					
10. 10			Xvlene)	10.165	1762.02	177.02
31						
12						
17						
2.39/			(unknowe)	14.233	131.55	N/A
15						
18						
17						
iš						

Lab name: ECT Mobile 1
Client: AMEPTEK
Client ID: 01446.L3
Collected: 12/1/94
Holding time: < 24 brs
Analysis date: 12/01/1994 1):23:25
Method: Direct Injection
Description: AMEPTEK - Mo. Smithfield
Column: MXT-1 0.53mm x 15 H
Carrier: Mitrogen
Data file: AMEPD3.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

lei ght	-25.400mV	256.000mV	Cemponent	Retartion	ਜ਼ੌ ਰ ਵਰੋ	External
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		1		VI 953		
2. 1		, ,	(unknova)	13.950	125.80	N/A
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	d : •	, , , , , , , , , , , , , , , , , , , ,				
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Lab name: ECT Hobile 1
Client: ANEFTEK
Client ID: 01446.L3
Collected: 12/1/94
Holding time: < 24 hrs
Analysis date: 12/01/1994 11:40:43
Method: Direct Injection
Description: ANEFTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 H
Carrier: Nitrogen
Data file: ANEFD4.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

Neight	-25.400mV	256.000mV	Commonent	Retention	Ar sa	External
			Europent	Retention	Ārea	External .
1. i		i	(unknown) Iy leng2	10.114 10.733 10.950	616.10 130.11 172.78	N/A H/A 7.50

Lab name: ECT Mobile 1
 Client: ANEPTEK
 Client ID: 01446.L3
 Collected: 12/1/94
 Holding time: < 24 hrs
 Analysis date: 12/01/1994 12:15:43
 Nethod: Direct Injection
 Description: AMEPTEK - No. Smithfield
 Column: MXT-1 0.53mm x 15 M
 Carrier: Witrogen
 Data file: ANEPD5.CHR (c:\chrom\data\aneptek)
 Sample: 200 ul vapor
 Operator: Andrew Tingley

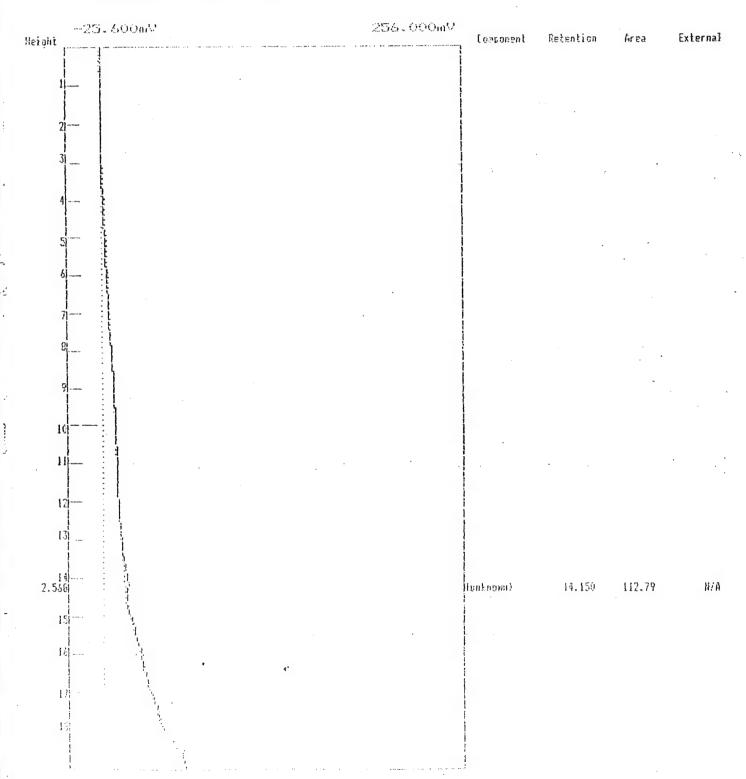
	Saight	-25.	. 600m%	 	255.000mV	Consonent	Retention	Area	External
	:	2			5 1 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3				
-		3)							
		5)							
•	,	55 1							
		8	L	·					
								-	•
1	4. 1 4.03 1 3.35					(unknown) Xylenel	10.183	330.75 138.59	H/A 15.39
		2				(unknown)	11.150	126.93	N/A
		1 - :					·		
		\$	\(\begin{align*} \frac{1}{2} & \\	٠٠			•		
									•

Lab name: ECT Mobile 1
Client: ANEPTEK
Client ID: 01446.L3
Collected: 12/1/94
ding time: < 24 brs
ysis date: 12/01/1994 13:40:51
Method: Direct Injection
scription: AMEPTEK - No. Smithfield
Column: NXT-1 0.53mm x 15 M
Carrier: Mitrogen
Data file: AMEPDA CHR (c:\chrom\data Client ID : Collected : Holding time : Analysis date :

Description:

Carrier : Data file : AMEPDS.CHR (c:\chrom\data\aneptek)

Sample : Operator : : 200 ul vapor : Andrew Tingley



Lab name: ECT Mobile I
Client: ANEPTEK
Client ID: 01446.L3
Collected: 12/1/94
Holding time: < 24 brs
Analysis date: 12/01/1994 15:21:57
Method: Direct Injection
Description: ANEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEPD7.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

lleight	-25.600mV	254.000mV	Component	Retention	Area	External
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5		7 Language (1994) (1994				
in the state of th		to a comp many page of				
7		The second secon			•	
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5		er engelskapisk er de				
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Lab name: ECT Hobile 1
Client: ANEFTEK
Client ID: 01446.L3
Coilected: 12/1/94
Holding time: (24 brs
Analysis date: 12/01/1974 15:40:12
Nethod: Direct Injection
Description: ANEFTEK - No. Smithfield
Column: MXT-1 0.SBmm x 15 H
Carrier: Nitrogen
Data file: ANEFD8.CHR (c:\cbrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew lingiey

Heiq!	-2000 at	500mV	and the second s		236.00	OmV Loopenent	Retention	Area	External
	1					i general i direction de la company			
	2					s, philade and the same of the			
	3								_₹ €
	4-								
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	7	; 							
	8								
	5	[}				ł			
4	10	3				Xvlenel	10.550	350.84	39.92
	620		•						
**	127 -	1							
-	13								
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	18	And the state of t	•						
	17			**					
	10	4							
	:								

Lab name: EUT Mobile 1
Client: ANEFTEK
Client ID: 01446.L3
Collected: 12/2/94
Holding time: < 24 hrs
Analysis date: 12/02/1994 12:53:10
Method: Direct Injection
Description: ANEFTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEPAIL.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley SB-09-02.5

Height .	-25.600mV	253.000mV	Çoenongat	Retention	Ĥrea	External
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17						
19					•	
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Lab name : EUT Mobile i ab name: EUT Mobile i
Client: ANEPTEK
tent 1D: 01446.L3
tlected: 12/2/94
og time: < 24 hrs
is date: 12/02/1994 13:19:09
Method: Direct Injection
ciption: ANEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M SB-09-07.5 Client 1D : Collected : Holding time: Analysis date: Description: Carrier : Data file : Nitrogen ANEPAi2.CHR (c:\chrom\data\aneptek) Sample : 200 ul vapor Operator : Andrew Tingley -25.600 mV256.000mV Commonent Retention Area Externa! Height Ethyl Benzene 6.400 147.44 14.46 2.806 2.947 10 (lunkrown) 9.933 130.20 N/A 2.901 Mylenel 10.583 107.18 12.13 11 12 131 14 15 16 2.091 15,400 102.94 M/A (unknown) 17 10

Lab name : EUT Mobile t Client : AMEFTEK SB-09-12 Client ID: 01446.L3 01446.L3 12/2/94 < 24 hrs 12/02/1994 13:53:32 Direct Injection ANEFTEK - No. Smithfield MXT-1 0.53mm x 15 M Nitrogen Collected: Holding time : Analysis date : Method: Description : Column: Carrier : Data file : Data file: ANEFAI3.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley 256.000mV -25.600mV External Retention Area Inenogent llei cht

N/A

N/A

117.95

118.45

13.566

18.016

(unknown)

Runkaean)

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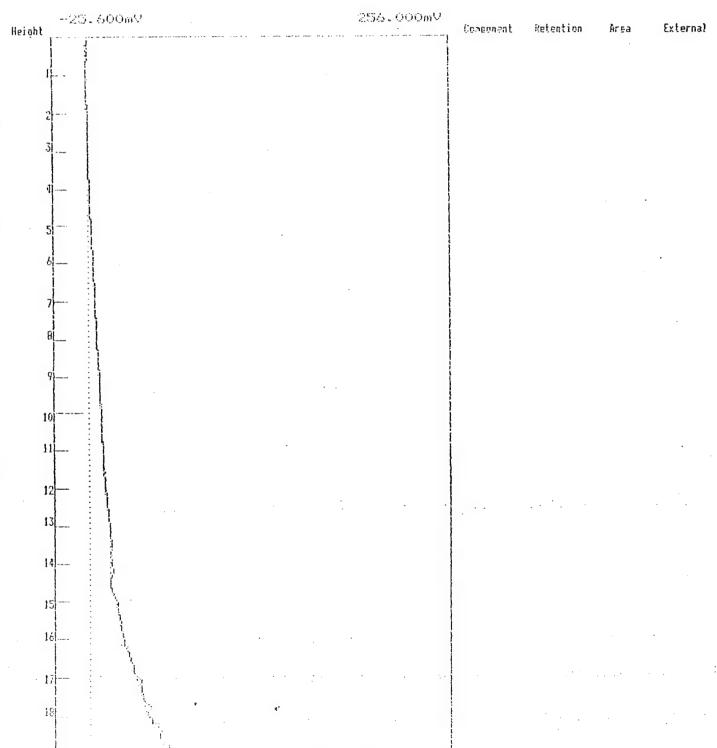
16

17

5. 18

2.232

Lab name: E01 Nubite 1
 Client: ANEPTEK
Client ID: 01446.L3
Collected: 12/2/94
Holding time: < 24 hrs
Analysis date: 12/02/1994 15:00:47
 Nethod: Direct Injection
Description: ANEPTEK - No. Smithfield
 Column: MXT-1 0.53mm x 15 M
 Carrier: Nitrogen
Data file: ANEPAI4.CHR (c:\chrom\data\aneptek)
 Sample: 200 ul vapor
Operator: Andrew Tingley



Lab name: ECT Mobile 1
Client: ANEFTEK
Client ID: 01446.L3
Collected: 12/2/94
Holding time: < 24 hrs
Analysis date: 12/02/1994 15:26:04
Method: Direct Injection
Description: ANEFTEK - No. Smithfield
Column: HXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEFATS.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley SB-10-04

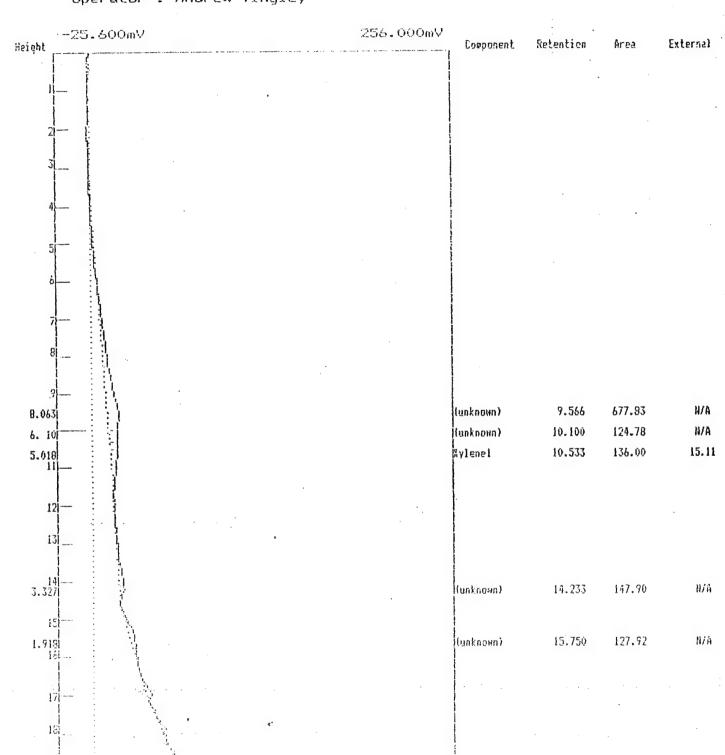
-25.600mV Height	Committee and the committee of the commi	256.	OOOmV	Commonent	Retention	Area	External
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2 :							
		•					
4						•	•
						•	
5							
5							
	• .		-				
7- :							
9							•
				4			
11.717				 lunknown)	9.315	349.13	N/A
				}			
6. 10				(unknown)	9.966	108.68	H/A
11		•					
11.019				Xylene3	11.416	217.59	21.77
8. 12				(unknown)	12.055	189.45	A/H
9.782				(lunknown)	13.100	149.24	N/A
8.951				(unknosn)	13.515	235.76	N/A
12.318				(uaknowa)	14.155	270.60	n/a
13.003							
1 , 1				(unknown)	15.350	251.82	WA
18. 16				lual nown)	15.033	323.84	WA
9-996		* **	. •	(lenknoen)	15.900	119.41	· W#+
11.361	4 *			(ցոկոցսո)	17.593	174.84	WA
11.361 18 11.194				(unkaeun)	19.766	100.07	N/A

Lab name: ECT Mobile 1
Client: AMEPTEK
Client ID: 01446.L3
Collected: 12/2/94
Holding time: < 24 hrs
Analysis date: 12/02/1994 15:51:35
Method: Direct Injection
Description: AMEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEPA16.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

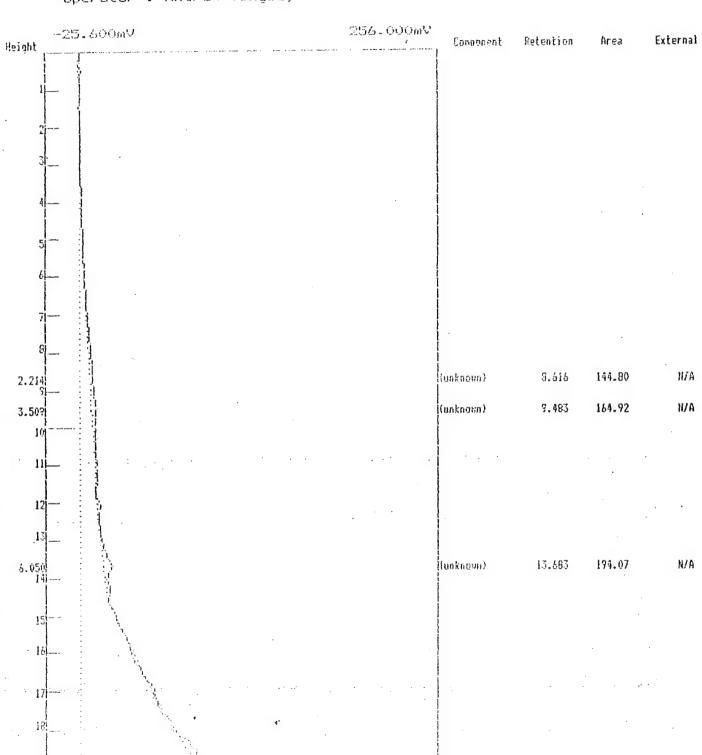
-25.600mV Height	256.000mV	Companent	Retention	Area	External
1]					
2 - {					,
3				٠.	
			:		
-					
5					
b					
1					
9.860		(unknown)	7.283	240.22	N/A
		PCE	9.133	435.57	87.23
11.699		100	9.105	703.37	07,29
29.591		i (tunknoun)	9.350	1008.78	N/A
		(trahamum)	10.014	7.4 GA&	21/0
24. 10 8.210		(unknown) Xylenel	10.016 10.366	449.63 112.05	11/A 12.45
15.735		i Kylene3 Kylene3	11.233 11.500	358.19 325.41	35.00 31.91
15. 735		Į.			51.91 N/A
17. 12	•	(unknown) {unknown}	12.116	330.28 134.81	N/A
6.049 13 10.518		 (unknown)	13.183	144.20	N/A
		(unknowa)	13.716	366.67	A/H
16.909 14 9.087		(และกอยก)	14.233	174.50	A/A
6.702		Tri He Benzene	14.765	111.08	0.02
26.302		(unknown)	15.350	507.39	N/A
21. 16		(แก่หกัดมก)	16.055	467.40	N/A
		1	•		
8. 17		(waknown)	17.186	206.93	N/A
14.712		(watnown)	17.556	365.56	H/A
9.244		(estaçon)	18.544	102.72	11/4

Lab name: ECT Mobile 1
Client: AMEPTEK
Client ID: 01446.L3
Collected: 12/2/94
Holding time: < 24 hrs
Analysis date: 12/02/1994 16:18:10
Method: Direct Injection
Description: AMEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M

Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEPA17.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley



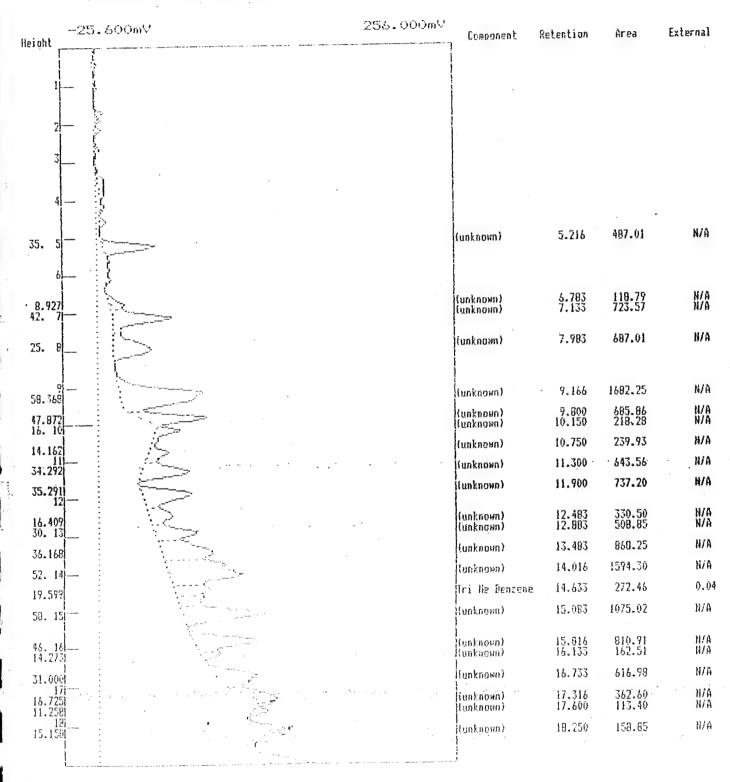
Lab name : ECT Mobite 1
 Client : ANEPTEK
 Client ID : 01446.L3
 Collected : 12/5/94
Holding time : < 24 hrs
Analysis date : 12/05/1994 13:00:03
 Method : Direct Injection
 Description : ANEPTEK - No. Smithfield
 Column : MXT-1 0. Samm x 15 M
 Carrier : Nitrogen
 Data file : ANEPA22.CHR (c:\chrom\data\aneptek)
 Sample : 200 ul vapor
 Operator : Andrew Tingley



Ltd fragat ANEPTEK 01446.L3 12/5/94 Lab Dame Client Client ID Collected 24 hrs Holding time 12/05/1994 13:26:28 Analysis date Direct Injection ANEPTEK - No. Smithfield Method Description MXT-1 0.53mm x 15 M Col umn Carrier

Nitrogen ANEPA23.CHR (c:\chrom\data\aneptek) Data file

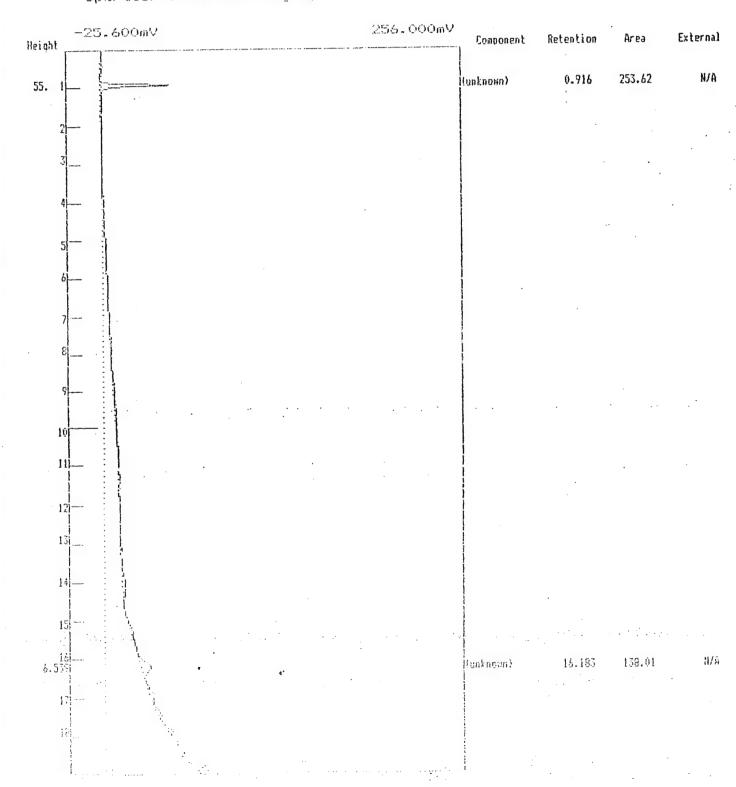
200 ul vapor Sample Andrew Tingley Operator



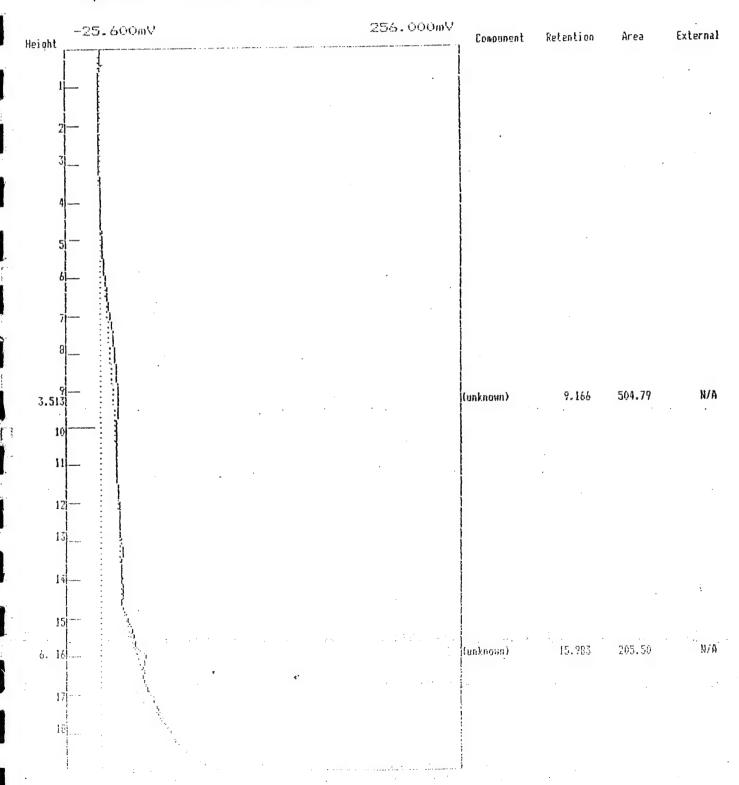
Lab name: ECT Mobile 1
Client ID: 01446.L3
Collected: 12/5/94
Holding time: < 24 hrs
Analysis date: 12/05/1994 13:51:55
Method: Direct Injection
Description: ANEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEPA24.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

Height	-25.	500mV			2	56.000mV	Coaconent	Retention	Area	External
1	-6									
2	- [
\$	<u></u>						and the second second second second			
S		1								
-	7								-	
1	8	1								·
4.05 1	0			٠.			(unknown)	9.766	189.58	N/A
1		,		·		٠.		: .		
	3									
	4					,				
24.28	15		en en men j	4. * ·		e e e e e e e e e e e e e e e e e e e	(unknown)	15.100	576.07	N/A
	1/1			4*)				· 0 277	177 61	n/a
\$.48	65	-					(tankagsa)	19.233	177.01	41) B

Lab name : ECT Mobile 1
Client : ANEPTEK
Client ID : 01446.L3
Collected : 12/5/94
Bing time : < 24 hrs
/sis date : 12/05/1994 15:30:52
Method : Direct Injection
scription : ANEPTEK - No. Smithfield
Column : MXT-1 0.53mm x 15 M
Carrier : Nitrogen
)ata file : ANEPA26.CHR (c:\chrom\data\aneptek)
Sample : 200 ul vapor
Operator : Andrew Tingley Lab name : Client : ECT Mobile 1 Client ID : Collected : Holding time : Analysis date : Description : Column : Carrier : Carrier : Data file :



Lab name: ECT Mobile 1
Client: ANEPTEK
Client ID: 01446.L3
Collected: 12/5/94
Holding time: < 24 hrs
Analysis date: 12/05/1994 15:56:26
Method: Direct Injection
Description: ANEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEPA27.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

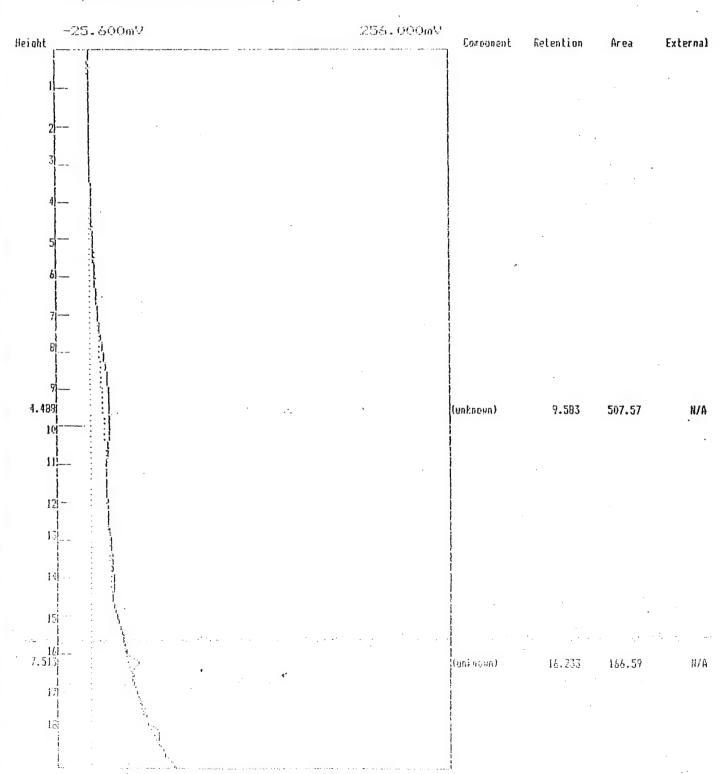


Lab name: ECT Mobile 1
Client: ANEPTEK
Client ID: 01446.L3
Collected: 12/5/94
Holding time: < 24 hrs
Analysis date: 12/05/1994 16:22:22
Method: Direct Injection
Description: ANEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEFA28.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley

Height	-25.600mV	256.000mV	Component	Retention	Area	External
3 3 4 5 7		A PARA PARA PARA PARA PARA PARA PARA PA				
5: 59 5:547 10			(vakaska) (vakaska)	8.950 9.366	462.94 356.61	N/A N/A
13 14 15 13. 18			(ការុខបចិរុមា)	16.065	275.46	н/а

Lab name : ECT Mobile 1 Client : ANEFTEK Client ID : 01446.L3 Client ID: 01446.L3
Collected: 12/6/94
ding time: < 24 hrs
ysis date: 12/06/1994 11:37:08
Method: Direct Injection
scription: ANEFTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 M
Carrier: Nitrogen
Data file: ANEFA33.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley Collected:
Holding time:
Analysis date:

Description:
Column:
Carrier:
Data file:



Lab name : ECT Mobile 1 Client : ANEPTEK Client ID : 01446.L3 Client ID : Collected : 12/6/94

12/6/94

4 24 hrs
12/06/1994 12:02:22

Direct Injection

ANEPTEK - No. Smithfield

MXT-1 0.53mm x 15 M

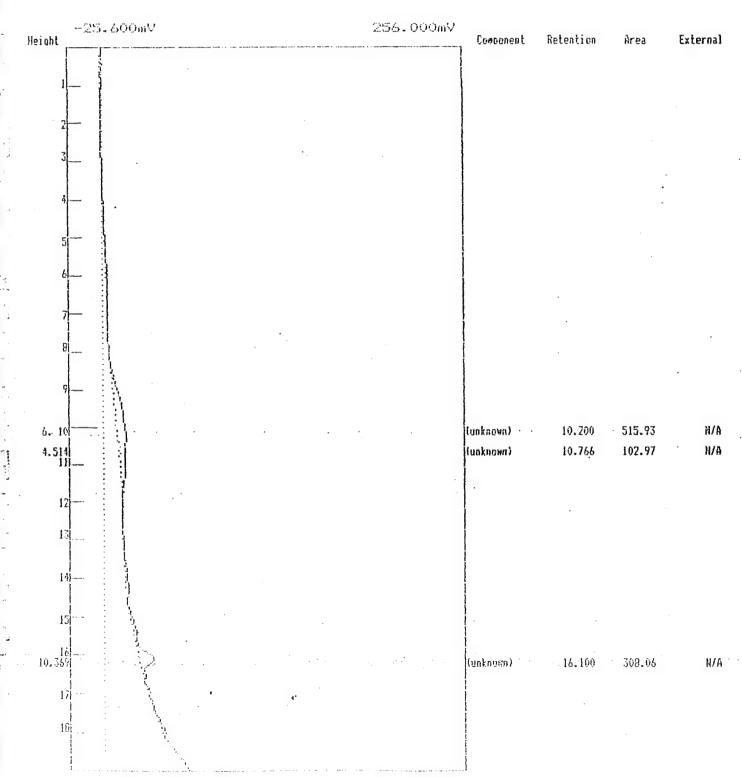
Nitrogen

ANEPASA CHR (c.)chrom/dal Holding time : Analysis date Method: Description:

Column : Carrier :

Carrier : Data file : ANEPA34.CHR (c:\chrom\data\aneptek)
200 ul vapor
Andrew Tingley

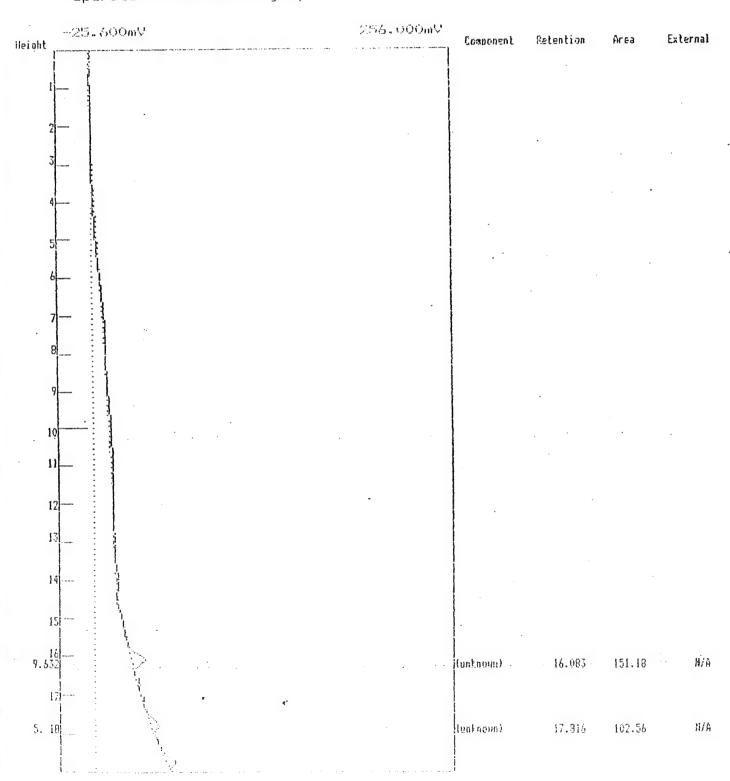
Sample: Operator:



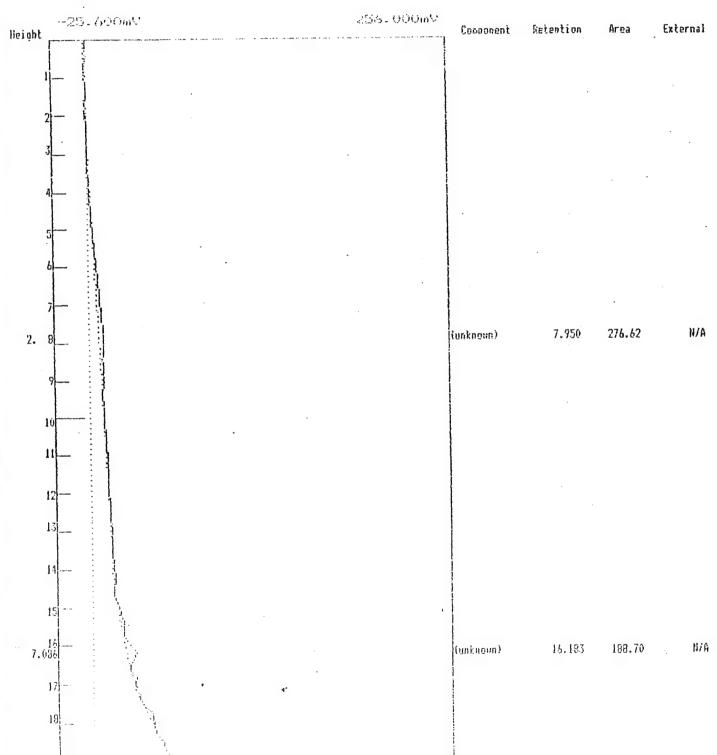
Lab name : ECT Mobile 1 Client : ANEPTEK

Height	5.600mV	254.000mV	Consonent	Retention	Area `	External
1			·			
2-				÷		
3						
4					•	
5		to pure all the same persons				
6		transition of the state of				
7		s of head and the second				
91						
5. 10			(แกะกอะก)	10.200	327.94	. H/A
11						
12			٠			
13						
4.136			iunkaown)	14.400	198.59	N/A
15 12.025			(บกหกดูชก)	15.466	1179.71	H/A
16			en e	· · · · · · · · · · · · · · · · · · ·	٠	·
14.064			(unknawi)	17.400	552.10	N/A
12. 18			(megashu)	15.000	350.54	N/A

Lab name: ECT Mobile 1
Client: ANEPTEK
Client 1D: 01446.L3
Collected: 12/6/94
Holding time: < 24 hrs
Analysis date: 12/06/1994 12:56:21
Nethod: Direct Injection
Description: ANEPTEK - No. Smithfield
Column: MXT-1 0.53mm x 15 h
Carrier: Nitrogen
Data file: ANEPA36.CHR (c:\chrom\data\aneptek)
Sample: 200 ul vapor
Operator: Andrew Tingley



Lab name: ECT Mobile 1
 Client: AMEPTEK
Client ID: 01446.L3
Collected: 12/6/74
Holding time: < 24 hrs
Analysis date: 12/06/1994 13:27:28
 Method: Direct Injection
Description: ANEPTEK - No. Smithfield
 Column: MXT-1 0.53mm x 15 H
 Carrier: Nitrogen
Data file: ANEPA\$7.CHR (c:\chrom\data\aneptek)
 Sample: 200 ul vapor
Operator: Andrew Tingley



APPENDIX C

SOIL BORING/MONITORING WELL LOGS

K	ANEP			во	RING LOG	Boring	1_of NoSB-	01
DRILLER CONSULTA		d GeoScienc	e, Inc.	TIMES DRILL RIG TO WEATHER/TEI	11/29/94 10:50 a.m 12:10 p.m. HSA (4.25") MObil B-53 MP. clear, sunny/50's MATER TABLE 7.5 FT.	National Guar	Smithfield Air d, North Smith ACE ELEVATION ntinuous sampl	field, RI
		SAMP	LING		SAMPLE D	ESCRIPTION		
DEPTH BELOW GRADE (FT.)	(SPT) BLOWS PER 6	PEN	REC	TYPE				HNU
1	2 4 3	24"	17	SPT	Moist, brown, fine to coars trace coarse to fine gravel	e sand, little to s	same silt,	HNU — Oppm
2	8			-				нио – оррпі
34	28 110 100/2	20"	13"	SPT	Top 3": As above. Lower 10": Moist, very dense trace coarse to fine gravel.	se, gray fine sand	I, trace silt,	HNU — Oppm
	10		27	COT	Moist, dense, gray fine san	nd. trace coarse t	o medium	
5	19 20	24"	9"	SPT	sand, trace silt, trace fine	to coarse gravel.		
6	15 20					1		
7	10	24"	13"	SPT	Moist, medium dense gray medium sand, trace silt, tr	fine sand, trace race coarse to fin	coarse to ne gravel.	
8	8	1						
9	9/5"	5"	o"	SPT	No recovery. Wet, gray sand	d and silt on out	side of spoon.	HNU — Oppm
10								
11					Refusal at 8.4° with both		3.	
12		<u> </u>			End of boring at 8.4' grou			
13		1.			Note: augered through gra at ~3'.	iver and coopies t	beginning	
14		1						
15								
16								
17								
18								
19					 			
20		-						
GR	ANULAR SO	iLS		VE SOILS	(SPT)		PROPORTIONS	WATER CONTENT
BLOWS/	FT. DEI	NSITY	BLOWS/FT.	DENSITY	REC	- Penetrated - Recovered	Troce 0 to 10%	D Dry
<4 4-10 10-30	LO	LOOSE OSE DENSE	<2 2-4 4-48 8-15	V. SOFT SOFT M. STIFF STIFF	Wante a two feet long 2 " SS -	- Hollow-Stem Auger - Split Spoon - Photoionization Detector	Little 10 to 20% Some 20 to 35% And 35 to 50%	M = Moiet W = Wet

³⁰⁻⁵⁰ DENSE 15-30 V. STIFF
>50 V. DENSE >50 HARD

• Measured at end of drilling. During drilling, W.T. measured at 8.4*

	1	PTEK DRATION		BOI	RING LOG	İ	Sheet <u>1</u> of <u>1</u> Boring No. <u>SB-02</u>			
PROJECT	North	Smithfield	ANGS	DATE _1	1/29/94		Smithfield Air			
JOB NO.					2:30 - 4:10 p.m.	_ 1	d, North Smith			
							ACE ELEVATION			
		ard	i	DRILL RIG TY	PE HSA (4.25") Mobil B-	-53				
		er GeoScienc			p. clear, sunny, 50's	COMMENTS So	mples - every			
LOGGED E	3YJH	ager			ATER TABLE 9 F	T. in AOC B W.L	at 2.1' after	to nrs.		
0.5071		SAMP	LING		SAMPLE	DESCRIPTION				
DEPTH BELOW GRADE (FT.)	(SPT) BLOWS PER 6	PEN	REC	TYPE				HNU		
1	. 4 8 10	24"	6"	SPT	Top 2": Moist, loose brow fragments, little to same Lower 4": Moist, medium	silt, trace coarse to	o fine gravel. fine sand.	HNU = Oppm		
2	12				trace coarse to medium gravel.	sand, little silt, trac	e coarse fine			
3										
4										
5		-								
6	22 31	24*	20"	SPT	Top 2": Moist, medium d	ense, light brown fir	ne sand, trace	HNU = Oppm		
7	33 35				to fine gravel. *Lower 18": Wet, dense					
8					coarse medium sand, tra	ice coarse to fine g	ravel.			
9										
10			·					HNU = Oppm		
11					Augered to 10' — rare of sample taken at 10'. Cu little clay, trace coarse	uttings are gray fine	sand and silt,			
12					to fine gravel. End of boring at 10°. G					
13					End of borning de 10. G	routed to surroce.				
			,				i			
14										
15										
16										
17										
18										
19										
20					(CDT)		DDODOSTIONS	***************************************		
1	ANULAR S			VE SOILS	(SPT) Standard Penetration Test~	PEN - Penetroted	PROPORTIONS	WATER CONTENT		
BLOWS/		DENSITY	BLOWS/FT.	V. SOFT		REC - Recovered HSA - Hollow-Stem Auger	Trace 0 to 10%	D = Dry		
<4 4-10	1	V. LOOSE LOOSE	2-4	SOFT	30" onto a two foot long 2 "	SS - Split Spoon	Little 10 to 20% Some 20 to 35%	M = Moist W = Wet		
10-30		M. DENSE	4-8 • 8-15	M. STIFF STIFF	O.D. split spoon sampler	PID - Photoionization Detector	And 35 to 50%			
30~50 >50		DENSE V. DENSE	15-30 >50	V. STIFF HARD						

Sheet __1__of __1__

[•] Color change (and change to medium dense to dense)estimated at 5.5°

	ANEP' corpor			ВО	RING LOG	1	1 of 1 No. SB-03	
DRILLER CONSULTA		l GeoScience	e, inc.	DRILL RIG TO WEATHER/TEI	11/30/94 10:45 a.m 12:10 p.m 4.25" HSA (PE Mobil B-53 MP. clear, sunny, 50's (ATER TABLE >10 FT.	National Guar GROUND SURF COMMENTS C	Smithfield Air rd, North Smith FACE ELEVATION ontinuous sampl ater comes into	field, RI
		SAMPI	ING			DESCRIPTION		
DEPTH BELOW GRADE (FT.)	(SPT) BLOWS PER 6"	PEN	REC	TYPE				HNU
1	*	24*	2*	SPT				HNU = Oppm
2	53	24			Moist fill, loose brown coar coarse to fine gravel.	rse to fine sand, l	little silt, trace	
3	3	24"	5"	SPT				
4	3 10	24		3,1	Moist fill, medium brown c little silt, trace coarse to	oarse to fine sand fine gravel.	d, trace to	•
5	12	24"	0"	SPT				
	9	24		31.	No recovery — spoon hit of obstruction out of the way	obstruction at 6" . but collected no	- pushed sample.	
6	7				Top 4": As above (SPT SB			
7	5	24"	10*	SPT	ments in spoon. Bottom 6: In grass sleeve			HNU = Oppm
8	18 25				material within sleeve: Mois sand, trace silt, trace coal	st dense to very o	lense fine gray	
9	40 25	24"	18"	SPT	coarse to fine gravel.			
10	40 47				Moist very dense fine gray sand, trace silt, trace coa	rsand, trace coan rse to fine gravel.	se to medium	
11	63 28	18.5"	18"	SPT	Moist, very dense, gray fir	ne sand, little coa	rse to medium	HNU = Oppm
12	63 87	1			sand, trace silt, trace coa			HNU = Oppm
13	100/05				Refusal with spoon at 12.5 Augered to 12'. Boring wa		on Left open	
13					overnight to determine if	water will collect.	on. Lere open	
14					End of boring at 12.5'.**			
15					Grouted to surface on 12,	/2/94.		
16						,		
17		1			-			
18								
19								
20								
GR/	ANULAR SOIL	ĻŞ	COHESIVI	E SOILS	(SPT)		PROPORTIONS	WATER CONTENT
BLOWS/	FT. DEN	ISITY	BLOWS/FT.	DENSITY		- Penetroted - Recovered	Trace 0 to 10%	D = Dry
<4 4-10 10-30	LOC	LOOSE OSE DENSE	<2 2-4 4-8 8- 1 5	V. SOFT SOFT M. STIFF STIFF.	140 lb. weight falling HSJ 30" onto a two foot long 2 " SS	A - Hollow-Stem Auger - Split Spoon I - Photoionization Detector	Little 10 to 20% Some 20 to 35% And 35 to 50%	M = Moist W = Wet

* Gravel at surface down to 0.5'. Driller shoveled away gravel to reach sand at 0.5' and started sampling there.

STIFF.
V. STIFF
HARD

** Boring still dry after 24 hours.

V. DENSE

DENSE

8-15 15-30

>50

10-30 30-50

>50

K	ANI		EK TION		ВО	RIN	NG LOG			1 of1 NoSB_0	
PROJECT							0/94	_	LOCATION N.	Smithfield Air	
JOB NO.			-		TIMES	2:05	pm - 2:55 pm	-			
CONTRACT							4.25" HSA_		GROUND SURF	ACE ELEVATION	
				lnc lnc			Mobil B-53	-	COMMENTS S	ampling every	5' in
CONSULTA				, inc.			clear, sunny, 50's	_		oc c	
LOGGED	BY	nuger		· · · · · · · · · · · · · · · · · · ·			R TABLE ~10.5	1.			
			SAMPI	INC	during drillir	T		DES	CRIPTION		
DEPTH			JAMPI		1	-					HNU
BELOW GRADE (FT.)	(SPT) BLOWS PER 6		PEN	REC	TYPE						
1	1		24*	12"	SPT	Mois	st fill, very loose, bro dium sand, trace little	own f e silt.	ine sand, trace	coarse to	
2	3	\dashv									HNU = Oppm
						7	gered through cobbles	to f	5'.		-
3		-+				- 709	gered through cobbles				
4											
-		\Box									
5	1					Mois	st fill, medium dense,	brov	vn fine sand, tr	ace coarse to	
6	2	\Box	24**	5"	SPT	frag	lium sand, little silt, iments of coarse gra	trace vel b	coarse to line roken by spoon.	Stem root	
7	30	=					iments.				
8	12	\dashv	24"	3"	SPT	Mois	st fill, medium dense	, bro	wn fine sand, tr	race coorse to	
9	6 4					med	dium sand, little silt, t fragments.	trace	coarse to fine	gravel. Stem	HNU = Oppm
10	4					Aug	ered through cobbles	to 1	0'.		
10	9/5 10	0/2	5"2"	0"	SPT	1	recovery.	_			
11			•	-		1	oon refusal at 10° 5	1/2"	•		
12							ger refusal at 10.5°. ttings wet.				
13						1	tungs wet. d of boring at 10.5°.	Grou	ited to surface.		
14							_ 0, 00/mg 01 10/0 i	3.00			
15											
16											
17											
18											
19			-								
20 GF	RANULAR	SOIL	5	COHES	IVE SOILS		(SPT)			PROPORTIONS	WATER CONTENT
BLOWS		DENS		BLOWS/FT.			Standard Penetration Test⇒	ł	Penetrated		
<4			OOSE	<2	V. SOFT		140 tb. weight folling	HSA -	Recovered Hollow-Stem Auger	Trace 0 to 10%	D - Dry M - Moist
4-10		L009		2- 4 4-8	SOFŢ. M. STIFF	F	30" anta s two foot long 2 " O.D. split spoon sampler	I .	iplit Spoon Photoionization	Some 20 to 35% And 35 to 50%	W = Wet
10-30 30-50			DENSE	8-15	STIFF		U.U. spec spoon sampler		Detector		
>50		DEN: V. D	ENSE	15-30 >50	V. STIFF HARD						

			TEK		ВО	RING LOG	Boring	Boring No. SB-05		
PROJECT	Nor	th Sr	nithfield	ANGS	DATE	11/30/94	LOCATION N	. Smithfield Air		
JOB NO.					TIMES	4:00 pm - 5:30 pm	National Gua	rd, North Smith	field, RI	
							GROUND SURE	FACE ELEVATION		
			•		DOWN DIG TO	4.25" HSA (PE Mobil B-53	OKOGNE SOM	noe ecemmen		
CONSULTA					DRILL RIG II	MP. clear, sunny 50's	COMMENTS S	ampling every 5	·	
LOGGED E										
LOGGED E	3Y	go.				ATER TABLE 14.5				
DEPTH			SAMP	LING			E DESCRIPTION			
BELOW GRADE (FT.)	(SPT) BLOWS PER 6		PEN	REC	TYPE				HNU	
,	17		24"	18"	SPT	0 — 0.5 — Pavement Moist fill, dense, dark bi	rown fine to coorse	sand, little	HNU = Oppm	
	24	-		10	3,1	silt, trace coarse to fine	e aravel.			
2	21					Tip of spoon contained coarse to medium sand,	reddish brown tine s , little silt.	ona, trace		
,	22									
3						Augered through cobbles	to 5' (out of fill b	y 5').		
4										
5										
6	27 66		17"	17"	SPT	Moist, very dense, light	brown coarse to fin	e sand, little	HNU = 0ppm	
7	150/	/5"				coarse to fine gravel, t by spoon.	trace silt. Several co	bbles broken		
8										
9			÷.			Augered through cobble	s to 10'.		HNU = Oppm	
10										
10	11				-					
11	12		24"	14"	SPT	Wet, dense, light brown	fine sand trace silt,	trace to		
12	22 28					medium sand, trace coo	arse to fine gravel.			
13										
14						Augered 'through cobbles	s to 15'			
								•		
15	22	-			-	Wet, very dense, light b	prown fine sand trac	e coarse to		
16	45	\neg	20.5	14"	SPT	medium sand, trace silt	t, trace coarse to fir	ne gravel.	HNU = 0ppm	
17	70 100/:	25"				Tip of spoon possible s mica schist (musconite) musconite.				
18	-					Refusal of spoon at 16	8.5".			
10						End of boring at 16.7'.				
19						Grouted to surface 12/	1/94.			
20										
	ANULAR	SOIL	s	COHESI	VE SOILS	(SPT)		PROPORTIONS	WATER CONTENT	
BLOWS/		DENS		BLOWS/FT.	DENSITY	Standard Penetration Test=	PEN - Penetroted			
<4 4-10 10-30 30-50		M. D	ENSE SE	<2 2-4 4-8• 8-15 15-30	V. SOFT SOFT M. STIFF STIFF	140 b, weight falling 30 anto a two-foot long 2 " 0.D. split spoon sampler	REC - Recovered HSA - Hollow-Slem Auger SS - Split Spoon PID - Photoionization Detector	Troce 0 to 10% Little 10 to 20% Some 20 to 35% And 35 to 50%	D = Dry M = Moist W = Wet	
>50		V. D	ENSE	>50	HARD			1	L	

^{*} Dark before boring completed. ** W.L. 11.0' after 14.5 hours. (Boring left open overnight and grouted on 12/1/94)

1	ANE	PTEK	1			Sheet _	_101	
	CORPO	RATION		BOI	RING LOG	Boring	No. SB-0	6
PROJECT	North	Smithfield	ANGS	DATE	12/1/94	LOCATION N.	Smithfield Air	
JOB NO.				TIMES	10:00 am - 10:50 am	_	d, North Smith	
				TIMES		-	ACE ELEVATION	
		ord		DOUL DIO TO	4.25" HSA PE <u>Mobil B53</u>	GROOND SOM	7.02 2227777077	
		r GeoScience				COMMENTS S	ompling every	5'
LOGGED E			, , , , , , ,		MP. <u>clear, cold, 30's</u> ATER TABLE <u>7.8</u> F	on lawn in fr	ont of building	
LOGGED E	BY	- go.		after compl	etion of boring	-		
		SAMP	ING			DESCRIPTION		
DEPTH				T				НИИ
BELOW GRADE	(SPT) BLOWS	PEN	REC	TYPE				
(FT.)	PER 6"							
	3				Moist fill, grass at surfac	e with roots to 2".	Then dense,	
1	20	24"	13"	SPT-	dark brown to brown fine coarse to fine gravel. Bro	to coarse sand, lit oken cobble in spoo	itle silt, trace n tip.	HNU = 0ppm
2	15	-			,		·	
3					4 d th	to 5'		
4		\dashv			Augered through cobbles	to 5.		
<u> </u>								
5								
6	<u>39</u> 55	24*	12"	SPT	Upper ~4": As above.			HNU = Oppm
	47	27			Lower 8": Moist fill, very	dense, fine gray-b	rown sand,	
7	42				trace coarse to medium to fine gravel. Broken co	sand, trace silt, tra	ce coarse	
8					to fine graven. Broken ex	bolo lorger oper		
9				_				
10	<u> </u>							
	11							
11	19	24"	18"	SPT	Wet, dense, brown fine s sand, little silt, trace co	sand, trace coarse t arse to fine gravel,	o medium 2" x 1" piece	
12	34 47	\dashv			of gravel in spoon (gran	nite).		
		_						
13	 			_	End of boring at 12'.			
14					Grouted to surface 12/2	2/94.		
15	-							
16								
				i				
17					-			
18					_			
		_						
19	1							
26							Τ	-
	ANULAR S	OILS		VE SOILS	(SPT)		PROPORTIONS	WATER CONTENT
BLOWS/	/FT. [ENSITY	BLOWS/FT.	DENSITY	1	PEN Penetrated REC Recovered	Trace 0 to 10%	0 - Dry
<4		. LOOSE	<2 2-4	V. SOFT	140 lb. weight falling	HSA - Hollow-Stem Auger SS - Split Spoon	Little 10 to 20% Some 20 to 35%	M = Moist
4-10 10-30	1	.00SE n. DENSE	4-8	M. STIFF	30 gato di two locit king 2	PID — Photoionization Detector	And 35 to 50%	7 - Met
30-50		DENSE	8-15 15-30	STIFF V. STIFF		gettere.		
>50	\	/. DENSE	>50	HARD	1			

- * Water encountered at 8' during drilling. Rose to 7.8' at end of drilling and continued to rise thereafter.
- ** Estimate change to natural material at $\sim 5\,$ 1/2'

							4	1	
	I .	EPTEK PORATION		ВС	DRING LOG		Sheet1of1 Boring NoSB-07		
000:555	No	th Smithfiel	d ANGS		12/1/94	LOCATION N.	Smithfield Air		
PROJECT				DATE _	12:10 pm - 12:30 pm	-		Eald Di	
JOB NO.	941	10.32		TIMES _	12.10 pm = 12.30 pm	- National Guar	d, North Smith	neid, RI	
CONTRACT	OR				4.25" HSA	GROUND SURF	ACE ELEVATION		
DRILLER	Seab	oard		חמו וומח	TYPE Mobil B-53				
			nce, Inc.			COMMENTS S	ampling every	5'	
					EMP. clear, cold, 30°s	-		· · · · · · · · · · · · · · · · · · ·	
LOGGED E	3Y	nager		DEPTH TO	WATER TABLE 7.5 FT	1.		·	
				at end of	boring				
DEDTU		SAI	MPLING		SAMPLE	DESCRIPTION			
DEPTH BELOW	(007)							HNU	
GRADE	(SPT) BLOWS	PEN	REC	TYPE	1		l		
(FT.)	PER 6								
					0 - 0.5' Pavement				
1	8	24	12"	SPT				HNU=0.2ppm*	
-	8		1-12	311	Moist fill, medium dense, fine samd, trace silt, moi	gark brown to brovist little coarse to f	an coarse to 1	•	
2	8					ist made course to 1	9.0.0.		
	9				Augered through cobbles	to 5'.			
3					Auger refusal at 5' bedro		ter detected.		
					End of boring at 5'.		1		
4		_			Boring grouted to surface	2 .	I		
5									
6									
7	<u> </u>								
					7	•			
8					-		ļ		
9					_				
10				1			ļ		
,,,					1				
11					_				
12									
13									
					7	•			
14	-				-				
15					4				
16									
17									
17									
18					_				
19									
20							1		
	ANULAR	SOILS	COHE	ESIVE SOILS	(SPT)		PROPORTIONS	WATER CONTENT	
BLOWS/		DENSITY	BLOWS/F			PEN - Penetrated			
			<2	V. SOFT	R	EC - Recovered	Troce 0 to 10%	D = Dry	
<4		V. LOOSE	2-4	SOFT	1 TO 10. Weight rowing	HSA Hollow-Stem Auger HSS Split Spoon	Little 10 to 20% Some 20 to 35%	W = Noist W = Wel	
4-10 10-30		LOOSE	4-8	M. STIF		10 - Photoionization	And 35 to 50%		
30-50		M. DENSE DENSE	8-15	STIFF V. STIF	F	Detector			
>50		V. DENSE	15-30 >50	HARD	'				

^{*} HNU reading slightly above 0 appears to be background in this area affected by exhaust fumes from the rig.

	ANEPTEK							Sheetof1		
K		ORATION	!		BOI	RING LOG		Boring	NoSB-0)8
PROJECT	Nort	h Smithfie	ld ANGS	DAT	F .	12/1/94	LOC	ATION N.	Smithfield Air	
JOB NO.				TIME	_	1:50 pm - 2:20 pm	No.	tional Guar	d. North Smith	field. RI
					_				ing 102 and 1 ACE ELEVATION	U-T
i		oard		1	LL RIG TY	PE 4.25" HSA, Mobil B-5	53 —			
			ence, Inc.			IP. clear, cold, 30's	COM	MENTS S	ampling every 5	·
LOGGED E						ATER TABLE 6.5 F	FT. —			
					end of di	rilling				
DEPTH		SA	MPLING			SAMPLE	DESCRIPT	TION		
BELOW	(SPT)									HNU
GRADE (FT.)	BLOWS	PEN	N REC		TYPE					
(11.)	PER 6					0 - 05' 0				
1	70	24*	9"		SPT	0 — 0.5' Pavement Moist fill, medium dense,	, brown fir	ne sand, t	race coarse to	HNU=Oppm
	11	24			<u>-, , </u>	medium sand, trace silt,	, trace coo	arse to fin	e gravel.	• • •
2	9									
3	12	\dashv				Augered through cobbles	to 5'.			
4						•	•			
5		\dashv								
	20			,		Ton O' An Inch				HMU-0
6	20	24"	14		SPT	Top 2": As above. *Lower 12": Wet fill, den	nse, liaht h	orown fine	sand, trace	HNU=0ppm
7	15	-				coarse medium sand, litt	tle silt, tro	ice coarse	to fine gravel	
8	Ë					End of boring at 7°. Gra	outed to s	surface.		
	<u> </u>									
9	-			_		!				
10										
11										
12										
13										
14										
15		\dashv								
16										
17										
18	1									
19										
20	-	-								
	RANULAR	SOILS	COH	HESIVE S	OILS	(SPT)			PROPORTIONS	WATER CONTENT
BLOWS/		DENSITY	BLOWS/		DENSITY		PEN - Penetrate			
<4		V. LOOSE	<2		V. SOFT	140 lb. weight folling	REC - Recovered HSA - Hollow-S	item Auger	Trace 0 to 10% Little 10 to 20%	D - Dry M = Moist
4-10		LOOSE	2-4 4-8		SOFT M. &TIFF		SS Split Spoo PIO Photoionia		Some 20 to 35% And 35 to 50%	W - Wet
10-30 30-50		M. DENSE DENSE	8-15		STIFF	од, эри эроон затрег	Detector			
>50		V. DENSE	15-30 >50		V. STIFF HARD					

^{*} Estimate change to natural material at ~5".

	1 ANE	PT	EK						Sheet _	of	1	
K	CORP				ВО	RIN	NG LOG		Boring	NoSB-0	09	
PROJECT	Nort	h Sn	nithfield	ANGS	DATE	12/2	2/94	_		Smithfield Air		
JOB NO.							5 am — 12:20 pm	_	National Guar NE of bldg 1	d, North Smith	field, R	1
CONTRACT										ACE ELEVATION		
DRILLER				1	DRILL RIG T	YPE	HSA 4.25", Mobil B-	53	AOC A			
CONSULTA				1			partly cloudy, ~30°F		COMMENTS			
LOGGED B	3Y_ J. I	lager	•				R TABLE 8.3 F					—
					after ∼ 1	hour						$=$ \perp
DEPTH			SAMPI	LING			SAMPLE	DES	CRIPTION			1
BELOW GRADE (FT.)	(SPT) BLOWS PER 6		PEN	REC	TYPE						чн	10
	40	\Box	24*	19"	SPT		 0.5' Povement 13": Moist fill, red-t 	orown	fine sand, trac	e medium	HNU =	- Oppm
1	12	-+	24	19	SFI	to o	coarse sand, trace sit	t. Iitt	le coarse to fin	e gravet		
2	16					brov	wer $\sim 6^{\circ}$: (change in what fine sand, trace c	oarse	medium sand,	troce silt,		
3	25	\dashv				trac	ce coarse to fine grav	∕ei.				
						Aug	ered through cobbles	to 5	3.			
4		-			-		,					
5												
6	25 19	\dashv	24"	15"	SPT	Mois	st, tip of spoon wet, se coarse to medium	dense	e, gray-brown f	ine sand,	HNU =	= Oppm
	15	二	~ '			trac	e coarse to medium	Sano	, trace siit, trac	e inte groves.		
7	_18_				 	1						
8					<u> </u>	Aug	gered to 10' through	occo	sional cobbles.			
9			:									
10												
	26				ODT.	Wet	t, very dense, gray-bi	rown	fine sand, trace	coarse to	UNII -	= 0ppm
11	46 54		24"	20"	SPT	me	dium sand, trace fine	to	coarse gravel, lit	ttle silt.	nivo -	- Орріп
12	51					En	d of boring at 12°. G	route	d to surface.			
13												
14							·					
15												
15						1						
16			-		+	1						
17						-						
18												
19												
20						1						
20 GR	ANULAR	SOIL	5	COHESIV	E SOILS		(SPT)			PROPORTIONS	WATER	CONTENT
BLOWS/		DENS		BLOWS/FT.	DENSITY		Standard Penetration Test=		Penetrated			
<4			OOSE	<2	V. SOFT		140 lb. weight folling	HSA -	Recovered Hollow-Stern Auger	Troce 0 to 10% Little 10 to 20%	D = Dry M = Moi	
4-10		L009		2-4 4-8•	SOFT M. STIFF		30 anto a two foot long 2 "		iplit Speen Photoionization	Some 20 to 35% And 35 to 50%	w - we	
10-30 30-50			DENSE	815	STIFF		O.D. split spoon sampler		Detector			
>50		DENS V. D	SE ENSE	15-30 >50	V. STIFF HARD							

^{*} Out of fill at $\sim 1 \ 1/2' - 2'$ below ground surface.

	ANI	EPTEK				Sheet1of1		
K	1	PORATION		ВО	RING LOG		No. SB-10	
PROJECT	Nor	th Smithfield	ANGS	DATE _	12/2/94	LOCATION N	Smithfield Air	
JOB NO.					1:30 pm - 2:30 pm	National Guar	d, North Smith	field, RI
						GROUND SURF	ACE ELEVATION	
				DRILL RIG T	YPE 4.25" HSA, Mobil B-	_53 AOC A		
		jer GeoScier		WEATHER/TE	MP. partly cloudy, ~30° F	COMMENTS C	ontinuous samp	ling
				DEPTH TO V	NATER TABLE ~7	г т. ———		
					ngs ofter 72 hours		т	
DEDTU		SAN	IPLING		SAMPLE	DESCRIPTION		
DEPTH BELOW	(SPT)							HNU
GRADE (FT.)	BLOWS		REC	TYPE				
(11.)	PER 6						on modified	
1	19 14	24"	13"	SPT	Moist fill, coarse gravel dense, dark brown to br	own coarse to fine :	sand, little	HNU=0 ppm
<u> </u>	9	, 24			silte, trace coarse to fin	e gravel.		
2	7				-			HNU=0 ppm
3	18	24"	19*	SPT	Top 3": As above. + Bottom 16": Moist, de	ense, light brown to	gray-brown	
<u> </u>	25				fine sand, trace coarse fine gravel.	to medium sand, tro	ce silt, trace	HNU=0.5ppm*
4	30							HNU=8ppm **
5	18	24"	18"	SPT	Moist, dense, light brown trace coarse to medium	i to gray—brown silty sand, trace coarse	tine sand, to fine gravel,	HNU=3.5 -
_	17				trace clay, broken cobble	e in spoon.	· /	5 ppm (sample in
6	9				Spoon tip wet, dense, gr	rav-brown silty fine	sand, trace	spoon)
7	17_	24"	12"	SPT	coarse to medium sand,	trace coarse to fin	e gravel, trace	
8	22				clay.			HNU=Oppm
					Augered to 7'. Cuttings HNU in breathing zone =	wet. HNU at drill bit = 0.4 ppm.	=10 ppm	
9					End of boring at 8'. Gra			
10								
11					4			
12					4		!	
13								
14							_1	
15								
16								
17								
18								
19								
20								
	ANULAR	SOILS	COHES	SIVE SOILS	(SPT)		PROPORTIONS	WATER CONTENT
BLOWS/		DENSITY	BLOWS/FT	. DENSITY	Standard Penetration Test-	PEN - Penetroted REC - Recovered		
<4		V. LOOSE	<2	V. SOFT	170 D. Bergin, Towning	HSA - Hollow-Stem Auger	Troce 0 to 10% Little 10 to 20%	D = Dry M = Moist
4-10		LOOSE	2-4 4-8	SOFT M. STIFF	30 onto a two foot long 2 O.D. split spoon sampler	SS - Split Spoon P10 - Photoionization	Some 20 to 35% And 35 to 50%	W - Wet
10-30 30-50		M. DENSE DENSE	8-15 15-30	STIFF V. STIFF		Detector		
>50		V. DENSE	>50	HARD				<u> </u>

DENSE V. DENSE ** At ground level. Up to 17 ppm when wind died down.

X		PTEK		BOI	RING LOG	No. <u>SB-11</u>	\$B-11		
PROJECT	North	Smithfield	ANGS	DATE	12/5/94		Smithfield Air		
).32			11:25 am - 12:15 pm	National Guar	d, North Smith	field, RI	
						of building 10 GROUND SURF	ACE ELEVATION		
		ord		DRILL RIG TY	PE 4.25" HSA, Mobil B-	53			
		r GeoScienc			IP rain, 40's				
		iger			ATER TABLE 7.5	п. —			
200025				after drilling					
		SAMP	LING		SAMPLE	DESCRIPTION			
DEPTH BELOW GRADE (FT.)	(SPT) BLOWS PER 6	PEN	REC	TYPE				HNU	
1	10	24"	12"	SPT	Moist fill, medium to der to fine gravel, little coar	nse coarse gravel, In rse to fine brown sa	nd, trace	HNU=Oppm*	
	15 10	24	- '-	1.511	silt. +Tip of spoon contained				
2	14				to medium sand, little s	ilt, trace fine gravel.			
3		-							
<u> </u>					Augered through cobbles	to 5'. Strong odor	in soil at 5'.		
4								HNU=20ppm	
5		-						• borehole	
	21				Wet, dense, gray fine sa	indy silt, trace coars	e to medium	HNU=0.4ppm in breathing	
6	21 16	24**	12"	SPT	sand, trace coarse to fit Sheen on water in spoot	ne gravel, trace little n.	e clay.	zone	
7	16								
		_						HNU=0ppm during augering	
9					Augered through cobbles	to 10°.		HNU=7ppm in augers	
10								HNU=Oppm breathing zone	
11	22 31	24"	18"	SPT	Wet, very dense, gray finedium sand, trace fine	ne sandy silt, trace e gravel, trace clay.	coarse to	20110	
12	54	_			End of boring at 12'.				
	56				Sheen on water in borin	g at completion of	drilling.		
13					Grouted to surface.				
14									
15									
16									
17									
18									
19					1				
20									
	ANULAR S	OILS	COHESI	VE SOILS	(SPT)		PROPORTIONS	WATER CONTENT	
BLOWS/	FT. C	ENSITY	BLOWS/FT.	DENSITY	Standard Penetration Test=	PEN - Penetrated REC - Recovered	Y 0 to 107		
<4 4-10 10-30	L	LOOSE OOSE LOOSE	<2 2-4 4-8	V. SOFT SOFT M. STIFF STIFF	140 lb, weight falling 30"onto a two foot long 2 " 0.0. split spoon sampler	HSA - Hollow-Stern Auger SS - Split Spoon PID - Photoionization Detector	Troce 0 to 10% Uitile 10 to 20% Some 20 to 35% And 35 to 50%	D = Dry M = Moiet W = Wet	
30-50 >50	1	DENSE V. DENSE	8-15 15-30 >50	V. STIFF					
ł	, ,		700	1 0		<u> </u>			

⁺ Estimate change to natural material at $\sim 2'$. • Odor evident at $\sim 1.5'$.

Will	ANE	PTEK				Sheet _1of _1		
K		RATION	_	ВО	RING LOG		NoSB-12	
PROJECT	North	Smithfield	ANGS	DATE	12/5/94	LOCATION N.		
JOB NO.		0.32			1:55 pm - 2:45 pm	National Guard south of builgi	North Smithf	ield, RI
						GROUND SURFA	CE ELEVATION	
DRILLER	Seabo	ord		DRILL RIG T	YPE 4.25" HSA, Mobil B-5	53		
		r GeoScienc	e, Inc.		MP. rain, 40's	COMMENTS HNU	readings bec	ouse errotic
LOGGED E				DEPTH TO W	VATER TABLEF	T. because of the	e rain	
		611.00	LING	after drilling		DESCRIPTION	T	
DEPTH		SAMP	LING		SAIN LE			HNU
BELOW GRADE (FT.)	(SPT) BLOWS PER 6*	PEN	REC	TYPE				DINU
1	23	24"	6*	SPT	0 - 0.5' Pavement *Moist fill, medium dense coarse to medium sand,	, brown fine sandy si trace coarse fine gro	ilt, trace	
2	12 12							
	12							
3					Augered through cobbles	to 5'.		
4								HNU=0ppm
5								
5	17				Moist very dense, gray-b	prown coarse to fine	sand, little	
6	24	24"	14"	SPT	silt, trace coarse to fine (cuttings wet at 7.5')	gravel.		
7	28 33				(Cottings wot dt 7.0)			
8					Augered through cobbles	to 10'.		
9								
					1			
10	33				Wet, very dense, gray-br	rown fine sandy silt.	trace coarse	
11	55	24"	15"	SPT	to medium sand, trace of Broken cobble in spoon.	coarse to fine gravel,	trace clay.	N.D.
12	40 76	\dashv			Dioneil coppie ill spooli.			
13					1			
14					End of boring at 12'. Gr	routed to surface.		
15					-			
16					-			
17					4			
18					-			
19					_			
20								
	ANULAR S	SOILS	COHES	IVE SOILS	(SPT)		PROPORTIONS	WATER CONTENT
BLOWS/		ENSITY	BLOWS/FT.	DENSITY		PEN Penetroted	0 to 10°	D = Dec
<4	\	/. LOOSE	<2	V. SOFT	140 lb. weight falling	HSA - Hollow-Stern Auger	Trace 0 to 10% Little 10 to 20%	D = Dry M = Noist
4-10	i	OOSE	2-4 4-8	M. STIFF	30 onto a two foot long 2	PiD - Photoionization	Some 20 to 35% And 35 to 50%	w - Wet
10-30 30-50	,	M. DENSE DENSE	8-15 15-30	STIFF V. STIFF		Detector		
>50		/. DENSE	>50	HARD				

^{*} Estimate change to natural material at $\sim 2^{\circ} - 2 \cdot 1/2^{\circ}$.

1	ANI				BORING LOG				Sheet 1 of 1		
	CORF	-URA	TION		RO	אואי	NG LUG			No. <u>SB-13</u>	
PROJECT	Nor	th Sr	nithfield	ANGS	DATE _	12/6	/94	_		Smithfield Air	1
JOB NO.	941	10.32	<u> </u>		TIMES1	10:10	am - 11:00 am	_	National Guar	d, North Smith	field, RI
CONTRACT	ror									ACE ELEVATION	
DRILLER	Seab	oard			DRILL RIG T	YPE	4.25" HSA, Mobil B-	<u>-5</u> 3			
CONSULTA							partly cloudy, 50's			ring was plann ence, but groun	
LOGGED 6	BYJ	Hager	•				R TABLE1	FT.	soft for rig o		10 #03 100
	1				after 3 hou	urs.	CAMPLE	DES	SCRIPTION		
DEPTH			SAMP	LING		_	SAMPLO		SCRIPTION		
BELOW GRADE (FT.)	(SPT) BLOWS		PEN	REC	TYPE		•				HNU
(11.)	PER 6	_				-				******	
1	44		24*	15*	SPT	Moi	- 0.5' Pavement st fill, very dense, br	own	fine sand, trace	coarse to	HNU=0ppm **
	65					Bro	dium sand, trace little ken cobbles in spoon	١.			
2	29		·			Tip	of spoon contained	lighte	r brown fine sa	nd.	
3						-					
4		\exists				Aug	gered through cobbles	to :	5'.	•	
5										·	
	18		0.4*	10*	SPT	Moi	st, very dense, gray-	-brow	n fine sand, tro	ice coarse to	
6	33 44	-	24**	12"	SPI	me	dium sand, trace silt	trac	e coarse to fine	e gravei.	N.D.
7	71					-					
8						Aug	gered through cobbles	to:	10'.		
9											
10											
11	30 100)/4"	10"	6*	SPT	me	t, very dense, gray—t dium sand, trace littl	le sili	fine sand, trac t, trace coarse	e coarse to to fine gravel.	N.D.
12							oon refusal in a cobl				
13						En	d of boring at 10.8'.	Grou	ited to surface.		
14											
15		=									
16											
17											
18											
19					-	1					
20						١.,	(CDT)			DOODOOTIONS	
	ANULAR				IVE SOILS		(SPT) Standard Penetration Test≈	PEN -	Penetrated	PROPORTIONS	WATER CONTENT
BLOWS/	/F1.	DENS		BLOWS/FT.	V. SOFT			REC -	Recovered	Trace 0 to 10%	D - Dry
<4 4-10		V. L	OOSE SE	2-4	SOFT		140 b. weight falling 30" onto a two foot long 2 "	55 - 5	Hollow-Stern Auger Split Spoon	Little 10 to 20% Some 20 to 35%	M - Moist W - Wet
10-30	İ	M. C	DENSE	4-8 8-15	M. STIFF	r	O.D. split spoon sampler	-	Photoionization Detector	And 35 to 50%	
30-50 >50		DEN:	SE ENSE	15-30 >50	V. STIFF HARD	-					
							<u> </u>			• • • • • • • • • • • • • • • • • • • •	

^{*} Estimate change to natural material at ~ 2.5'. ** HNU behaving very eratically — could not get repeatable readings.

	1	EPT PORA	EK TION		BO	RING LOG		1 of 1	
NA.					50	Kiivo 200	Boring	No. <u>SB-14/1</u>	ww-02
PROJECT JOB NO. CONTRACT	941	10.32	nithfield		D/ 1.7	1:25 am - 11:50 am	National Guar	Smithfield Air d, North Smith site ACE ELEVATION	
					DRILL RIG T	YPE 4.25" HSA, Mobil B-5	3		
CONSULTA				e, Inc.		MP. partly cloudy, 50's	COMMENTS BO	ring was planne	
LOGGED E	BYJ	Hager	-			VATER TABLEFT g 3' after 1 hour.	for rig acces	t ground was t s — MW-02 in:	oo soft stalled
DEPTH			SAMP	LING		SAMPLE	DESCRIPTION		
BELOW GRADE (FT.)	(SPT) BLOWS PER 6		PEN	REC	TYPE				HNU
1	15		24*	8"	SPT	0 -0.5' Pavement. Moist fill, medium dense, fine sand, little coarse to	dark brown to brown fine gravel, trace	wn coarse to silt.	N.D.*
2	10 10	\dashv		y		**Tin of spoon contained	brown fine sand, tr	ace coarse to	
3	4					medium sand, trace to gravel.	little silt, trace coa	rse to fine	
4						Augered through cobbles	to 5'.		
5									
6	40 56		24	21"	SPT	Wet, very dense, gray—bro medium sand, trace coars little silt.	own fine sand, trac se to fine gravel, t	e coarse to race to	N.D.*
7	65								
8						Augered to 8.5' to install	well. (see diagram	for MW-02)	
9			*.			End of boring at 8.5'.			
10									
11			· · · · · · · · · · · · · · · · · · ·						
12									
13			·						
14									
15									
16						-			
17									
18									
19						1			
20									
GR	ANULAR	SOILS	3		VE SOILS	(SPT)		PROPORTIONS	WATER CONTENT
BLOWS/	FT.	DENS	SITY	BLOWS/FT.	DENSITY	1	EN ~ Penetrated EC - Recovered	Trace G to 10%	D = Dry
<4 4-10 10-30 30-50 >50		V. LOOS M. D DENS V. DI	ENSE ENSE	<2 2-4 4-8 8- 1 5 15-30 >50	V. SOFT SOFT M. STIFF STIFF V. STIFF HARD	140 tb. weight falling HS	ISA - Hollow-Stem Auger S - Split Spaan ID - Photoionization Detector	Little 10 to 20% Some 20 to 35% And 35 to 50%	M = Moist W = Wet
								• • • • • • • • • • • • • • • • • • • •	·

^{*} HNU behaving very erratically — could not get repeatable readings, so values are not noted. ** Estimate change to natural material at $\sim 2' - 2 \ 1/2'$.

W	ANE	PTEK				Sheet _	1of1	
	CORPO	RATION		BOI	RING LOG	Boring	No	
PROJECT	North	Smithfield	ANGS	DATE	12/5/94	LOCATION N.	Smithfield Air	
JOB NO.		.32			3:05 am - 10:00 am		d, North Smith	ield, RI
						SG-54 GROUND SURF	ACE ELEVATION	
		ırd		DRILL RIG TY	PE 4.25" HSA, Mobil B-5	53		
		GeoScience			AP. rain, 50's	COMMENTS We	II installed - s	oil samples
	J. Ho				ATER TABLE ~9 FT		er logging - se	e
200002				during drilling	g	diagram for	MW-01	
DEPTH		SAMPI	ING		SAMPLE	DESCRIPTION		
BELOW	(SPT)				,			HNU
GRADE (FT.)	BLOWS	PEN	REC	TYPE			i	
(11.)	PER 6"				0.51.5			
1	16	24"	20"	SPT	0 - 0.5' Povement Upper 12': Moist fill, dens	e, dark to light bro	own fine sand,	HNU=Oppm
	19				trace medium coarse sand to coarse gravel.		1	
2	11				* Lower 8": Moist, dense, coarse to medium sand,	red-brown fine sar	nd, trace	
3	35				codise to mediani sono,	arde sinc.		Λ
4					Augered through cobbles t	to 5'.		
							į	
5					•			٠
6	19 23	24"	17"	SPT	Moist, dense to very dense trace coarse to medium	se, light gray—brown sand, little silt, trac	e coarse to 1	
	23				fine gravel, trace little cla	oy.		HNU=0ppm
7	15/4"							
8	10072				Augered through cobbles	to 10'.		
9								:
10						_11=.		
	16		_		Wet, very dense, gray—bro coarse sand, trace coarse	own fine sand silt, to	trace medium	HNU=0ppm
11	36 43	24"	17"	SPT	codise sand, trace course	o to imo grava, a -		
12	74							
13		-			Augered to 13' and instal	lled well (see diagra	m for MW-01)	
14					End of boring at 13'.			
14								
15								
16								
17								
18								
19		_						
20								
	ANULAR S	OILS	COHESI	VE SOILS	(SPT)		PROPORTIONS	WATER CONTENT
BLOWS/		ENSITY	BLOWS/FT.	DENSITY		PEN — Penetrated		
<4		LOOSE	<2	V. SOFT	140 lb, weight folling	REC Recovered HSA Hollow-Stern Auger	Trace 0 to 10% Little 10 to 20%	D Dry M = Moiet
4-10	1	OOSE	2-4 4-8	SOFT M. STIFF	30 onto a two root long 2	SS – Split Spoon P10 – Photoionization	Some 20 to 35% And 35 to 50%	w - Wet
10-30 30-50		I. DENSE	8-15	STIFF	G.O. spirit spoon sompler	Detector		
>50		ENSE '. DENSE	15-30	V. STIFF			}	

[•] Estimate change to natural material at 1 1/2' - 2'.

PROJECT North Smithfield ANGS 94110.32		ANEF	TEK				Sheet _1of	1
DOB NO. 94110-32 ONITINATION PAGE COORDINATION PAGE CONTINUANT Hager Coordinate Inc. LOGGED BY J. Hager ONSULTANT Hager Coordinate Inc. ONSULTANT Hager Coordinate Inc. LOGGED BY J. Hager ONSULTANT Hager Coordinate Inc. ONTE	K	CORPO	RATION		ВО	RING LOG	Boring No. MW-03	
1	PROJECT	North	Smithfield	ANGS	DATE	12/6/94	LOCATION N. Smithfield Air	
CONTRACTOR DRILLE R Seaboard CONSULTANT Hager CeoScience, Inc. LOGGED BY J. Hager SAMPLING SAMPLING SAMPLING SAMPLING SAMPLE DESCRIPTION SAMPLE DESCRIPTION HNU HNU HNU BLOWS (FT.) SET 15 BANK Hold for the fabruary and trace coarse to fine grovel, roots. A ger hit a boulder at 3'. Boring had to be moved 2' south and restarted. Color change at "4" to gray-brown. Wet, dense gray-brown fine sond trace coarse to medium sond, trace coarse to fine grovel, roots. Wet, dense gray-brown fine sond trace coarse to medium sond, trace coarse to fine grovel, roots. N.D.* Wet, dense gray-brown fine sond trace coarse to medium sond, trace coarse to fine grovel, roots. Wet, dense gray-brown fine sond trace coarse to medium sond, trace coarse to fine grovel, roots and trace coarse to fine grovel, roots. N.D.* N.D.* SAMPLE DESCRIPTION HNU HNU HNU SAMPLE DESCRIPTION N.D.* Ager hit a boulder at 3'. Boring had to be moved 2' south and restarted. Color change at "4" to gray-brown. Wet, dense gray-brown fine sond trace coarse to medium sond, trace coarse to fine gravel, roots and trace coarse to medium sond, trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to medium sond, trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to medium sond, trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots and trace coarse to fine gravel, roots an			32				National Guard, North Smith	field, RI
DRILL RIG TYPE 4.25 HSA Mobil 8-53 COMMENTS At adap of woods south of bose, west of occess road.							GROUND SURFACE ELEVATION	vell.
December 3. Hager Sept 1. Moder Sept	DRILLER	Seaboa	rdb		DRILL RIG T	YPE 4.25" HSA Mobil B-53		
DEPTH DEPT				e, Inc.				south of
DEPTH BELOW (SPT)	LOGGED E	BYJ. Had	ger		DEPTH TO V	WATER TABLE 3.5 FT.	base, west of access road.	
Sept Sept	1				auring ariii		SCRIPTION	
Company Comp		*	SAMP	LING		SAIN LE DE		HNII
No. PER 6"			PFN	REC	TYPE	}		HI4O
1	(FT.)							
1						Moist, very loose, brown fine	sandy silt, trace coarse to	ND+
Auger hit a boulder at 3'. Boring had to be moved 2' south and restarted. Color change at ~4' to groy—brown. 4	1		24"	13	SPI	1	1	N.D.*
South and restarted. Color change at ~4" to gray—brown.	2					Joan Grown organic and in an		
South and restarted. Color change at ~4" to gray—brown.	3		-{			Auger hit a boulder at 3'. B	oring had to be moved 2°	
S						south and restarted. Color c	hange at ~4° to gray—brown.	
Wet, dense gray—brown fine sand trace coarse to medium sand, trace coarse to fine gravel, trace silt. N.D.*	4			_				
10	5							
N.D. N.D. N.D.	6		24"	17"	SPT	Wet, dense gray-brown fine sand, trace coarse to fine g	sand trace coarse to medium pravel, trace silt.	
Sa		32						N.D.
12/7/94 and installed well. (see diagram for MW-03)	7	32	-			Ended at 7' and left overnig	ht augered to 8.5' on	14.0.+
9	8					12/7/94 and installed well.	(see diagram for MW-03)	
11	9		1			End of boring at 8.5°.		
11	10							
12	70							
13	11					-		
14	12							
15	13		\dashv					
15								
16 17 18 19 20 CRANULAR SOILS COHESIVE SOILS BLOWS/FT. DENSITY BLOWS/FT. DENSITY BLOWS/FT. DENSITY Stondard Penetration Test 4-10 LOOSE 4-8 10-30 M. DENSE 10-30 M. DENSE 30-50 DENSE 15-30 V. STIFF STIFF N. SFIFF STIFF DENSITY Stondard Penetration Test 140 B. weight falling 30 onto a two foot long 2 0.0. spit spoon sampler Detector PEN - Penatrated REC - Recovered HSA - Hotow-Stern Auger SS - Spit Spoon PID - Photoinization Detector PD - Photoinization Detector Detector PD - Photoinization Detector N. ST IFF Soft W - Wet Wet	14					1		
17	15					-		
19	16		1			_		
19	17							
19	18							
CRANULAR SOILS COHESIVE SOILS COHE								
CRANULAR SOILS COHESIVE SOILS CSPT								
BLOWS/FT. DENSITY BLOWS/FT. DENSITY Standard Penetration Test** PEN - Penatroted REC - Recovered HSA - Hollow-Stem Auger Little 10 to 20% M = Moiet Moie		ANULAR SC	ILS	COHESI	VE SOILS	(SPT)	PROPORTIONS	WATER CONTENT
<4				BLOWS/FT.	DENSITY			
4-10	<4	V.	LOOSE			140 lb. weight falling HSA -	Hollow-Stern Auger Little 10 to 20%	M = Moist
30-50 DENSE 15-30 V. STIFF >50 V. DENSE >50 HARD		1		4-8	M. S¶IFF	O.D. split spoon sampler PID -	Photoionization And 35 to 50%	W = Wet
>50 V. DENSE >50 HARD .	30-50						Detector	
+ UNIT behavior was existedly - could not get repeatable reggings so values are not noted.	1	V.	DENSE	>50	HARD	i i	not noted.	

	ANEP			BOI	RING LOG	}	Boring No. MW-04		
PROJECT JOB NO.	North Smithfield ANGS 94110.32			DATE	12/7/94 10:25 am - 1:00 pm		LOCATION N. Smithfield Air National Guard, North Smithfield, RI		
CONTRACT	OR					GROUND SURFA	ACE ELEVATION		
DRILLER		ď		DRILL RIG TY	PE 4.25" HSA, Mobil B-5	53		Al6	
		GeoScience		WEATHER/TEN	MP. cloudy, then rain, 40	comments ou	tn or		
LOGGED E	3YJ. Hag	jer		DEPTH TO WATER TABLE 3.5 FT. building 106 (motor pool)					
т				after drilling. SAMPLE DESCRIPTION					
DEPTH		SAMPL	ING		SAMPLE	DESCRIPTION			
BELOW GRADE (FT.)	(SPT) BLOWS PER 6°	PEN	REC	TYPE			20	HNU	
	1	24*	16"	SPT	Top 2": Moist very loose, litter, trace coarse to fine	aark brown organic s sand, trace coarse	silt w/ lear to fine	N.D. *	
1	2	24	10	3F1	gravel.				
2	5]			Battom 14": Loose, red—I sand, trace coarse to fin	brown silt, trace code e gravel.	arse to fine		
3					August sobbles	to 45'			
4		1		-	Auger refusal at 4.5°. Bo betewwn SG-57 and SG- Blows = 1-1-3-11	oring dry. Moved to to 76. Materail resamp	new location led at 0-2'.		
5		1							
6	88 62	. 24**	17"	SPT	Wet, very dense, gray broto medium sand, trace of	own fine sandy silt, coarse to fine gravel	trace coarse l. Broken		
7	60 59				cobble in spoon.				
8		-					4		
9		+			Augered to 8.5' through diagram for MW-04)	cobbles and installe	d well (see		
10								N.D. *	
11		-							
12					End of boring at 8.5°	,			
13									
14									
15								•	
16									
17									
18					1				
19									
20									
				VE SOILS	(SPT)		PROPORTIONS	WATER CONTENT	
BLOWS/				DENSITY	1	PEN - Penetrated REC - Recovered	Trace 0 to the	D = D=:	
<4 4-10 10-30	V.	V. LOOSE		V. SOFT SOFT M. STIFF STIFF	140 lb. weight folling 30" anto a two foot long 2	REC - Recovered HSA - Hollow-Stern Auger SS - Spilt Spoon PID - Photoionization Detector	Trace 0 to 10% Little 10 to 20% Some 20 to 35% And 35 to 50%	D — Dry M — Moist W = Wet	
30-50 >50	DI	ENSE DENSE	15-30 >50	V. STIFF HARD					

^{*} HNU could not be zeroed: negative readings only, so values were not recorded. Driller and inspector evaluated nature of material.

APPENDIX D

MONITORING WELL CONSTRUCTION LOGS

MONITORING WELL DIAGRAM - FLUSH MOUNT

JOB NO. 94110.32	WELL NO	MW-01	_ DATE/TIME		
				8:05am-10:00am	
PROJECT N. Smithfield ANGS	CONTRACTOR	Aneptek Corporation	LOCATION	N. Smithfield ANG	S,
				@5G-54, 5 OI DI	ag. 103
DRILLER Saaboard	CONSTITUTE	. Honer GeoScience: Inc.	LOGGED E	BY J. Hager	
DRILLER					
			NG POINT I	ELEV.	
VENTED W	ELL CAP ¬				
	. \	. /	CDOUND		
FLUSH-MOUNTED	* * ^ ^ ^	1	GROUND	sk.	
WELL COMPLETION		\ _ / \	SURFACE		
	\bowtie				
	IXXXk	 			
	R.X.A.	A AAAA			•
			CONCRETE S	SURFACE SEAL	
		 -	ACKEILL TY	PEgrout	
			, torti iee ''		
WELL RISER PIPE					
MATERIAL PVC					
DIAM 2"			NNULAR: SI	EAL TYPE- benton	<u>ite</u>
		4 4 4	chips	• • • • • • • • • • • • • • • • • • • •	
METHOD DRILLED		,	ROM · ······	<u>5</u>	BG ::
4.25" HSA Split Spoon Sampling	— /			REEN	
every 5' to 12' B.G.	_ /				
#1 sand from 6' to 5' B.G. ———		1	WELL SCRE		•
			MATERIAL-	•	
METHOD DEVELOPED			DIAM	2"	
·	[SLOT SIZE-	10	
			FROM	<u>12' то 7'</u>	BG
DATE TIME	. 1				
DATE TIME			FILTER MAT	ERIAL TYPE#2_	
WATERTABLE DEPTH BG			morie sar	nd	
William See See W. See East See See See See See See See See See Se			-nou 1	3' TO 6'	P.C
DATE TIME			- KUM	<u> </u>	BG
5/11C			воттом оғ	SCREEN12.0),
COMMENTS W.L. @ ~9' B.G.			BOTTOM OF	WELL 12.2'	90
· during drilling		77777			
			BOTTOM OF	BORING13.0'	= €
	/				
BG - BELOW GRADE BOTTOM	CAP -				
DG - DELOW GRADE SOTTOM					
				·	
		HOLE DIAMETER			

MONITORING WELL DIAGRAM - FLUSH MOUNT

JOB NO.	94110.32	WELL NO	MW-02 (SB-14)	DATE/TIME 12/0/94
JUD 1101				11:25am-1:50 pm
PROJECT	N. Smithfield ANGS	CONTRACTOR	. Aneptek Corporation	LOCATION N. Smithfield, ANGS
	:			NW corner of site
	Seaboard	- CONSULTANT	Haner GeoScience. I	no. 1.0GGED BY J. Hager
· DKILLER ~		المناب وعلمون والمحاصون		
• • • •			— MFASI	PRING POINT ELEV.
	VENTED	WELL CAP -	/	
		,	\ /	ODOLINO.
FLUSH-I	MOUNTED	* * * ^ ^ 1	1 1000	GROUND
WELL_CO	MPLETION		\ _ / \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	SURFACE .
ŽŽ _		\bowtie		•
	- 772 XX	KXXXI	J*****	
XXH		×.x.x		
		ļ		- CONCRETE SURFACE SEAL
		·	+- _	-BACKFILL TYPE- grout
WELL DIC	TO DIDE			
WELL RIS				
MATERIAL	PVC .	·		
DIAM:	2"			-ANNULAR SEAL TYPE- bentonite
METHOD I		• • • • •	4 4	chips
	* * ***		· <u></u>	FROM 25 TO 15
	HSA Split Spoon Sampling			TOP OF SCREEN 2.5'
evey 5	' to 7' B.G.	/	- 	
#1 san	d firm 25' to 2' B.G. —			WELL SCREEN
METHOD	DEVELOPED			MATERIAL PVC
METHOD	DEVELOR ED			DIAM 2"
				SLOT SIZE- 10
			11 <u> </u>	FROM7.5'TO2.5'
DATE	TIME		\	- FILTER MATERIAL TYPE#2
				·
WATERTA	BLE DEPTH BG			morie sand
				FROM 8.5' TO 2.5'
DATE _	TIME			
				- BOTTOM OF SCREEN 7.5'
	WIL 3 O' D C			77
COMMEN	TS W.L of 3.0' B.G.			BOTTOM OF WELL 7.7'
	at 1:00 pm on 12/6/94	1	1/1/1/2	- BOTTOM OF BORING8.5'
		/		- BUTTOM OF BURING
	•	TOM CAP -		

HOLE DIAMETER

MONITORING WELL DIAGRAM

JOB NO.	94110.32	WELL NO	MW-03	i	_ DATE/TIME	12/6/94 3:30pm (completed 12/7	n — 4:05pm /94 9:30 ai
PROJECT	N. Smithfield ANGS	CONTRACTOR	Aneptek	Corporation	_ LOCATION _	N. Smithfield ANd SG-32, west of	GS @ existing well
DRILLER	Seaboard	CONSULTANT	Hager Geo	Science, Inc.	LOGGED B	•	
					ING POINT EI		
	VENT	ED. MELL CAP		/		OTECTIVE CASING	
	21/2'			7		NGTH- 4.5' (3.3'	stick up)
						CRETE SURFACE SI	
2	1/2'					edges + 1.5' thic	
	POF <u>www</u>	****			* * * *	OUND RFACE	
· WELL R	ISER PIPE			E	BACKFILL TYP	E- <u>grout</u>	•
MATERIA	L PVC	-	+	-			
	2" DRILLED	-		/	ANNULAR SEA	AL TYPE-	<u>.</u>
4.25	HSA Split Spoon Somplin	ng every	· . 20 70 40 .		ROM 2'	TO1'	BG,
5' to	7' B.G.	/\				EEN <u>2.5'</u>	
#1 sar	nd from 2.5' to 2' B.G.	/		1 1	WELL SCREE	N PVC	
METHOD) DEVELOPED				DIAM	2"	
				1		5' TO 2.5'	
0.475	711.45				FILTER MATER	RIAL TYPE #2	
DATE _	TIME				morie sand		
WATERT	ABLE DEPTH BG			F	ROM <u>8.5</u>	_{TO} 2.5'	BG
DATE .	TIME				воттом ог	SCREEN 7.5'	
COMME	NTS <u>W.L. et 3.0' B.C</u>	G. at			BOTTOM OF	WELL 77'	BG
8:30	am on 12/7/94		91111		воттом ог	BORING 8.5'	BG
BG - E	BELOW GRADE 'BO	DITIOM CAP+					
		-		-			

HOLE DIAMETER